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Report on the individual review of the annual submission of Latvia submitted in 2014*

* In the symbol for this document, 2014 refers to the year in which the inventory was submitted, and not to the year of publication.

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I. Introduction and summary

1. This report covers the review of the 2014 annual submission of Latvia, coordinated by the UNFCCC secretariat, in accordance with the "Guidelines for review under Article 8 of the Kyoto Protocol" (decision 22/CMP.1) (hereinafter referred to as the Article 8 review guidelines). The review took place from 1 to 6 September 2014 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalists – Mr. Gebru Jember Endalew (Ethiopia) and Mr. Tomas Gustafsson (Sweden); energy – Mr. Darío Gómez (Argentina), Mr. James Aidan Kennedy (Ireland) and Mr. Michael Strogies (Germany); industrial processes and solvent and other product use – Ms. Elsa Hatanaka (Japan), Mr. Thapelo Clifford Mohale Letete (South Africa) and Mr. Andrew Neal (New Zealand); agriculture – Mr. Kingsley Kwako Amoako (Ghana) and Mr. Amnat Chidthaisong (Thailand); land use, land-use change and forestry (LULUCF) – Mr. George Mitri (Lebanon), Mr. Lucio Santos (Colombia) and Mr. Harry Vreuls (Netherlands); and waste – Mr. Cristóbal Félix Díaz Morejón (Cuba) and Mr. Takefumi Oda (Japan). Mr. Gómez and Ms. Hatanaka were the lead reviewers. The review was coordinated by Ms. Kyoko Miwa (UNFCCC secretariat).

2. In accordance with the Article 8 review guidelines, a draft version of this report was sent to the Government of Latvia, which provided a comment that was considered and incorporated, as appropriate, into this final version of the report. All encouragements and recommendations in this report are for the next annual submission, unless otherwise specified. The expert review team (ERT) notes that the 2013 annual review report of Latvia was published after 15 April 2014, which may have affected the Party's ability to implement recommendations and encouragements made in the previous review report.

3. All recommendations and encouragements included in this report are based on the ERT's assessment of the 2014 annual submission against the Article 8 review guidelines. The ERT has not taken into account the fact that Parties will prepare the submissions due by 15 April 2015 using the revised "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories" adopted through decision 24/CP.19. Therefore, when preparing the 2015 annual submissions, Parties should evaluate the implementation of the recommendations and encouragements in this report, in the context of those guidelines.

4. In 2012, the main greenhouse gas (GHG) emitted by Latvia was carbon dioxide (CO_2), accounting for 67.7 per cent of total GHG emissions[1] expressed in CO_2 equivalent (CO_2 eq), followed by nitrous oxide (N_2O) (16.5 per cent) and methane (CH_4) (14.9 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) collectively accounted for 0.9 per cent of the overall GHG emissions in the country. The energy sector accounted for 65.8 per cent of total GHG emissions, followed by the agriculture sector (22.0 per cent), the industrial processes sector (6.3 per cent), the waste sector (5.5 per cent) and the solvent and other product use sector (0.4 per cent). Total GHG emissions amounted to 10,979.65 Gg CO_2 eq and decreased by 58.1 per cent between the base year[2] and 2012. The ERT concluded that the description in the national inventory report (NIR) of the trends for the different gases and sectors is reasonable.

[1] In this report, the term "total GHG emissions" refers to the aggregated national GHG emissions expressed in terms of CO_2 eq excluding LULUCF, unless otherwise specified.

[2] "Base year" refers to the base year under the Kyoto Protocol, which is 1990 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. The base year emissions include emissions from sources included in Annex A to the Kyoto Protocol only.

5. Tables 1 and 2 show GHG emissions from sources included in Annex A to the Kyoto Protocol (hereinafter referred to as Annex A sources), emissions and removals from the LULUCF sector under the Convention and emissions and removals from activities under Article 3, paragraph 3, and, if any, elected activities under Article 3, paragraph 4, of the Kyoto Protocol (KP-LULUCF), by gas and by sector and activity, respectively.

6. Information to be included in the compilation and accounting database can be found in annex I to this report.

Table 1

Greenhouse gas emissions from Annex A sources and emissions/removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol by gas, base year[a] to 2012

			Gg CO_2 eq							*Change (%)*
		Greenhouse gas	*Base year*	*1990*	*1995*	*2008*	*2009*	*2010*	*2011*	*2012*	*Base year–2012*
Annex A sources		CO_2	19 052.46	19 052.46	9 035.41	8 106.34	7 418.27	8 500.38	7 751.16	7 434.90	–61.0
		CH_4	3 344.39	3 344.39	1 919.08	1 658.17	1 659.27	1 654.84	1 566.62	1 631.10	–51.2
		N_2O	3 816.20	3 816.20	1 547.25	1 648.77	1 684.11	1 747.77	1 734.94	1 816.31	–52.4
		HFCs	0.64	IE, NA, NE, NO	0.64	72.85	74.37	72.18	75.01	83.65	13 012.0
		PFCs	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA
		SF_6	0.23	NA, NE, NO	0.25	10.08	13.53	13.13	12.45	13.69	5 349.5
KP-LULUCF	Article 3.3[b]	CO_2				1 261.06	1 212.30	1 168.14	1 153.98	1 127.10	
		CH_4				NO	NO	NO	NO	NO	
		N_2O				37.62	38.30	37.60	36.75	35.66	
	Article 3.4[c]	CO_2	NA			–17 482.79	–15 461.10	–11 338.05	–11 634.82	–12 902.24	NA
		CH_4	NA			23.35	30.43	29.62	10.79	10.72	NA
		N_2O	NA			145.65	146.65	146.13	143.94	143.85	NA

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, IE = included elsewhere, KP-LULUCF = land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, NA = not applicable, NE = not estimated, NO = not occurring.

[a] The base year for Annex A sources refers to the base year under the Kyoto Protocol, which is 1990 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. The base year for cropland management, grazing land management and revegetation under Article 3, paragraph 4, of the Kyoto Protocol is 1990. For activities under Article 3, paragraph 3, of the Kyoto Protocol and forest management under Article 3, paragraph 4, only the inventory years of the commitment period must be reported.

[b] Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation.

[c] Elected activities under Article 3, paragraph 4, of the Kyoto Protocol, including forest management, cropland management, grazing land management and revegetation.

Table 2
Greenhouse gas emissions by sector and activity, base year[a] to 2012

			Gg CO_2 eq							Change (%)	
	Sector		Base year	1990	1995	2008	2009	2010	2011	2012	Base year–2012
Annex A sources	Energy		19 052.21	19 052.21	9 420.74	8 295.73	7 638.31	8 438.43	7 521.25	7 222.09	–62.1
	Industrial processes		598.44	597.55	155.88	307.03	304.18	565.72	657.62	688.68	15.1
	Solvent and other product use		42.91	42.91	40.22	43.93	39.42	41.69	45.44	48.51	13.0
	Agriculture		5 932.54	5 932.54	2 311.52	2 225.32	2 257.11	2 327.37	2 321.21	2 420.30	–59.2
	Waste		587.85	587.85	574.28	624.20	610.52	615.09	594.67	600.07	2.1
	LULUCF		NA	–19 866.69	–18 591.75	–16 328.44	–14 372.87	–11 129.94	–11 830.54	–12 300.54	NA
	Total (with LULUCF)		**NA**	**6 346.37**	**–6 089.12**	**–4 832.23**	**–3 523.33**	**858.37**	**–690.35**	**–1 320.89**	**NA**
	Total (without LULUCF)		**26 213.95**	**26 213.06**	**12 502.63**	**11 496.21**	**10 849.54**	**11 988.31**	**11 140.19**	**10 979.65**	**–58.1**
	Other[b]		NO	NO	NO	NO	NO	NO	NO	NO	NA
KP-LULUCF	Article 3.3[c]	Afforestation and reforestation				–19.02	–21.19	–23.15	–25.20	–27.34	
		Deforestation				1 317.70	1 271.80	1 228.89	1 215.93	1 190.10	
		Total (3.3)				**1 298.68**	**1 250.61**	**1 205.74**	**1 190.73**	**1 162.76**	
	Article 3.4[d]	Forest management				–17 313.79	–15 284.03	–11 162.30	–11 480.09	–12 747.67	
		Cropland management	NA			NA	NA	NA	NA	NA	NA
		Grazing land management	NA			NA	NA	NA	NA	NA	NA
		Revegetation	NA			NA	NA	NA	NA	NA	NA
		Total (3.4)	**NA**			**–17 313.79**	**–15 284.03**	**–11 162.30**	**–11 480.09**	**–12 747.67**	**NA**

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = land use, land-use change and forestry, NA = not applicable, NO = not occurring.

[a] The base year for Annex A sources is the base year under the Kyoto Protocol, which is 1990 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. The base year for cropland management, grazing land management and revegetation under Article 3, paragraph 4, of the Kyoto Protocol is 1990. For activities under Article 3, paragraph 3, of the Kyoto Protocol and forest management under Article 3, paragraph 4, only the inventory years of the commitment period must be reported.

[b] Emissions/removals reported in the sector other (sector 7) are not included in Annex A to the Kyoto Protocol and are therefore not included in national totals.

[c] Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation.

[d] Elected activities under Article 3, paragraph 4, of the Kyoto Protocol, including forest management, cropland management, grazing land management and revegetation.

II. Technical assessment of the annual submission

A. Overview

1. Annual submission and other sources of information

7. The 2014 annual submission was submitted on 15 April 2014; it contains a complete set of common reporting format (CRF) tables for the period 1990–2012 and an NIR. Latvia also submitted the information required under Article 7, paragraph 1, of the Kyoto Protocol, including information on: activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, accounting of Kyoto Protocol units, changes in the national system and in the national registry and the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol. The standard electronic format (SEF) tables were submitted on 15 April 2014. The annual submission was submitted in accordance with decision 15/CMP.1.

8. Latvia submitted revised emission estimates on 20 October 2014 in response to the list of potential problems and further questions raised by the ERT. In response to a recommendation made by the ERT, through the further exchange of views between the Party and the ERT on the possible approaches to resolve the issue of missing AD in the estimation of CO_2 emissions from iron and steel production, Latvia resubmitted its emission estimates on 26 November 2014 to reflect the revised CO_2 emission estimates for that category (see para. 50 below). Latvia submitted revised data on 20 October 2014 on the accounting of Kyoto Protocol units, KP-LULUCF activities, and activities under Article 3, paragraph 14, of the Kyoto Protocol in response to the list of potential problems and further questions raised by the ERT. The values used in this report are those submitted by Latvia on 26 November 2014.

9. The list of other materials used during the review is provided in annex II to this report.

2. Question(s) of implementation raised in the 2013 annual review report

10. The ERT noted that no questions of implementation have been raised in the 2013 annual review report.

3. Overall assessment of the inventory

11. Table 3 contains the ERT's overall assessment of the annual submission of Latvia. For recommendations for improvements for specific categories, please see the paragraphs cross-referenced in the table.

Table 3
The expert review team's overall assessment of the annual submission

Issue	*Expert review team assessment*	*General findings and recommendations*
The ERT's findings on completeness		
Annex A sources[a]	Complete	Mandatory: none

Issue	*Expert review team assessment*	*General findings and recommendations*
		Non-mandatory: N_2O emissions from fire extinguishers and aerosol cans; SF_6 emissions from imports in bulk and in products; CH_4 emissions from enteric fermentation (poultry); CO_2, CH_4 and N_2O emissions from waste incineration for the period 1990–1998; and CH_4 and N_2O emissions from other (waste) for the period 1990–2002 (see also paras. 42, 52, 90 and 92 below)
Land use, land-use change and forestry[a]	Complete	Mandatory: none
		Non-mandatory: the carbon stock changes in living biomass gains and dead organic matter for wetlands remaining wetlands; and CH_4 emissions from drainage of soils and wetlands (peatland)
KP-LULUCF	Complete	
The ERT's findings on recalculations and time-series consistency		
Transparency of recalculations	Sufficiently transparent, except for the waste sector	Please see paragraph 83 below for category-specific findings
Time-series consistency	Sufficiently consistent, except for the energy and waste sectors	Please see paragraphs 42, 90 and 92 below for category-specific findings
The ERT's findings on QA/QC procedures	Not sufficient	Latvia has elaborated a QA/QC plan and has implemented tier 1 QA/QC procedures in accordance with that plan. The ERT finds that the large number of mistakes in multiple sectors suggests that the tier 1 QC procedures are not being appropriately implemented
		Please see paragraphs 12, 14, 16, 22, 34, 48 and 56 below for category-specific recommendations
The ERT's findings on transparency	Not sufficiently transparent	Please see paragraphs 35, 41, 47, 58, 59, 70, 71, 72, 74, 86 and 108 below for category-specific recommendations

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, ERT = expert review team, KP-LULUCF = land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, QA/QC = quality assurance/quality control.

[a] The assessment of completeness by the ERT considers only the completeness of reporting of mandatory categories (i.e. categories for which methods and default emission factors are provided in the Intergovernmental Panel on Climate Change (IPCC) *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* or the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry*).

4. Description of the institutional arrangements for inventory preparation, including the legal and procedural arrangements for inventory planning, preparation and management

Inventory planning

12. The NIR described the national system for the preparation of the inventory. There were changes to the national system for the 2014 annual submission, as identified by the Party in its NIR (chapter 1.2, pages 38–46). The Ministry of Environmental Protection and Regional Development (MEPRD), Climate and Environmental Policy Integration Department, has overall responsibility for the national inventory. The Latvian Environment, Geology and Meteorology Centre (LEGMC) is responsible for collecting the activity data (AD) and preparing the emission estimates for the energy, industrial processes, solvent and other product use and waste sectors; the LEGMC Air and Climate Division compiles the final NIR using information from all involved institutions as well as summarized emissions data in the CRF Reporter software. For the 2014 annual submission, the quality manager from the LEGMC Air and Climate Division performed the overall quality assurance/quality control (QA/QC) procedures for all sectors according to the Party's QA/QC plan. The calculations of emissions and removals for the LULUCF sector were performed by the Latvian State Forest Research Institute "Silava" in collaboration with the Ministry of Agriculture (MoA). Silava is responsible for collecting the AD, preparing the removal/emission estimates and conducting the QC procedures, as well as for documenting and archiving the materials used for the calculations. The Institute of Physical Energetics (IPE) calculates the emission estimates for the transport sector in accordance with an agreement with MEPRD. IPE is responsible for collecting the AD, preparing the emission estimates and conducting the QC procedures, as well as for documenting and archiving the materials used for the calculations. The emission estimates for the agriculture sector were estimated by the Latvia University of Agriculture in collaboration with MoA. The Latvia University of Agriculture is responsible for collecting the necessary AD, cooperating with the Central Statistical Bureau of Latvia (CSB), preparing the emission estimates and conducting the QC procedures, as well as for documenting and archiving the materials used for the calculations.

13. The ERT acknowledges that, in response to the recommendations made in previous review reports, Latvia has implemented and reported changes in the departments/divisions involved in the compilation and reporting of the national GHG inventory. To ensure the continuity of the functions of the national system, the delegation contract is signed between MEPRD and LEGMC, Silava, IPE and the Latvia University of Agriculture. The ERT commends Latvia for implementing the planned inventory improvements and encourages the Party to continue improving the quality of the inventory.

14. In response to a question raised by the ERT during the review on why not all sectors are covered in the QA procedures, Latvia explained that when taking into account financial resources, it is not possible to involve third-party experts in the QA activities for all sectors, every year. The ERT notes that such financial constraints pose difficulties for the Party to effectively implement the QA/QC activities included in the QA/QC plan. The ERT therefore recommends that Latvia allocate sufficient resources for the implementation of the QA/QC plan, but especially with regard to the QC activities performed by the inventory compilers preparing the NIR and the CRF tables.

Inventory preparation

15. Table 4 contains the ERT's assessment of Latvia's inventory preparation process. For improvements related to specific categories, please see the paragraphs cross-referenced in the table.

Table 4
Assessment of inventory preparation by Latvia

Issue	*ERT assessment*	*ERT findings and recommendations*
Key category analysis		
Was the key category analysis performed in accordance with the IPCC good practice guidance and the IPCC good practice guidance for LULUCF?	No	Level and trend analysis performed including and excluding LULUCF, but not in line with the IPCC good practice guidance (see para. 16 below)
Approach followed?	Tier 2	
Were additional key categories identified using a qualitative approach?	No	
Has the Party identified key categories for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol following the guidance on establishing the relationship between the activities under the Kyoto Protocol and the associated key categories in the UNFCCC inventory?	Yes	All KP-LULUCF activities (mandatory and elected) are key categories
Does the Party use the key category analysis to prioritize inventory improvements?	Yes	
Assessment of uncertainty analysis		
Approach followed?	Tier 1	Performance of a tier 2 uncertainty analysis using the Monte Carlo model is planned for 2015 (see para. 19 below)
Was the uncertainty analysis carried out in accordance with the IPCC good practice guidance and the IPCC good practice guidance for LULUCF?	No	See paragraph 18 below
Quantitative uncertainty (including LULUCF)	Level = 29.6% Trend = 137.1%	
Quantitative uncertainty (excluding LULUCF)	Level = 20.7% Trend = 9.8%	

Abbreviations: ERT = expert review team, IPCC good practice guidance = Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, IPCC good practice guidance for LULUCF = IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry*, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = land use, land-use change and forestry

16. The ERT noted that according to tables A.1.1–A.1.4 in annex 1 to the NIR, Latvia only included 90 per cent of the cumulative emissions for its tier 1 level and trend key category analysis. This is not in line with the Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance), which states that 95 per cent of the emissions should be included. The ERT also noted that table A.1.1 (level assessment for 2012 without LULUCF) and table A.1.5 (level assessment for 1990 without LULUCF) include LULUCF categories, while table A.1.6 is identical to table A.1.5 attached below it. Additionally, the ERT identified inconsistencies between the information reported in CRF table 7 and the NIR. The ERT also noted that there are cases where the disaggregation of key categories in CRF table 7 is not clear (e.g. unmanaged waste disposal sites (CH_4 emissions) and solid waste disposal (CH_4 emissions)). The ERT therefore recommends that Latvia report the key categories in accordance with the IPCC good practice guidance, and consistently report the results in the NIR and the CRF tables. The ERT also recommends that Latvia allocate sufficient time and human resources to the final stages of the inventory compilation process in which cross-sectoral work such as the key category analysis occurs, and enhance its QC procedures so that similar errors are avoided in future annual submissions (see also para. 22 below).

17. The ERT noted high uncertainty for the AD in some key categories (e.g. residential heating (other sectors) – liquid fuels (50.0 per cent); direct soil emissions (40.0 per cent); natural gas distribution (25.0 per cent); and manure management (40.0 per cent)); and the emission factors (EFs) (e.g. managed waste disposal on land (52.0 per cent)). The ERT encourages Latvia to consider options to progressively reduce the uncertainty of the AD, EFs and other parameters that are used for the key categories.

18. The ERT noted that the calculations of the uncertainties associated with the total national emission estimates of Latvia are not correct. Latvia has calculated the square root of the square of the sum of the uncertainty estimate of individual categories (NIR tables A.7.1 and A.7.2), which indicate the sum of the uncertainty estimate of individual categories, not the uncertainties of individual categories associated with the total national emission estimates; this is not in line with the IPCC good practice guidance. In response to a question raised by the ERT during the review, Latvia provided the spreadsheet used for the calculations, which confirmed the error. The ERT recommends that Latvia report the uncertainties associated with the total national emission estimates based on equation 6.4 of the IPCC good practice guidance in its next annual submission.

19. The ERT noted that Latvia is planning to perform a tier 2 uncertainty analysis using the Monte Carlo model within the framework of the programme "European Economic Area Financial Mechanism 2009–2014 – National Climate Policy". The ERT encourages Latvia to implement this uncertainty analysis and report on the progress in the next annual submission.

Inventory management

20. There were no changes to the inventory management process carried out by the Party for the 2014 annual submission, as indicated by the Party in its NIR. The description of the inventory management process, as contained in the report of the individual review of the annual submission of Latvia submitted in 2013,[3] remains relevant.

21. Latvia has a centralized archiving system, which includes the archiving of disaggregated EFs and AD, and documentation on how these factors and data have been generated and aggregated for the preparation of the inventory. The archived information also includes internal documentation on QA/QC procedures, external and internal reviews, documentation on annual key categories, key category identification and planned inventory

[3] FCCC/ARR/2013/LVA, paragraphs 20–22

improvements. Latvia also reported, in its NIR, that all information used for the compilation of the inventory is stored on the special server and that backups of data are carried out periodically. Printed copies of the NIR are stored in the archives of LEGMC and MEPRD in May each year, after the completion and submission of the inventory. All information is archived on CD-ROMs as well. The expert organizations involved in the preparation of the inventory also have archives located at their own facilities.

22. In relation to the Party's resubmission of 26 November 2014, which was submitted in response to the list of potential problems and further questions raised by the ERT, the ERT noted that the estimates of total emissions from consumption of halocarbons and SF_6 changed for the years 2002–2011 from the original submission. However, Latvia was not requested by the ERT to recalculate these emissions as part of the resubmission, since any issues relating to this category were not identified in the list of potential problems, and the Party was unaware of these changes. The emission estimates from this category provided in the resubmission increased by relatively minor values for the years 2008–2012, and decreased for the years 2002–2007. The ERT recommends that Latvia correct this error, and further recommends that the Party strengthen the QC checks to adequately track any changes in the reporting between the original submission and the successive resubmissions, if any, of its national inventory (see also para. 16 above).

5. Follow-up to previous reviews

23. The ERT noted that Latvia has fully or partly implemented a number of recommendations made in the previous review report, including:

(a) The institutional structure, responsibilities and functions of the institutions involved in the inventory preparation process have been well explained in chapter 1.2 of the NIR;

(b) The recommendation that the Party include explanations of the emission trends by sector in order to improve the transparency of the reporting has been addressed by introducing new subchapters under chapter 2.3 of the NIR;

(c) Information on the use of the uncertainty analysis in prioritizing inventory improvements has been provided for the sectors with the most uncertainties, such as the energy and LULUCF sectors. The categories with the largest uncertainties have been revised and the uncertainty levels have been reduced as far as possible;

(d) There has been a significant improvement in the QA/QC system following the development of a QA/QC plan (Regulation No. 217, section III). Additional QC checks by third-party experts have been conducted periodically. For example, a review of the energy, agriculture and waste sectors was conducted for the 2014 annual submission.

24. Recommendations from previous reviews that have not yet been implemented, as well as issues the ERT identified during the 2014 annual review, are discussed in the relevant sectoral chapters of the report and in table 9 below.

B. Energy

1. Sector overview

25. The energy sector is the main sector in the GHG inventory of Latvia. In 2012, emissions from the energy sector amounted to 7,222.09 Gg CO_2 eq, or 65.8 per cent of total GHG emissions. Since 1990, emissions have decreased by 62.1 per cent. The key drivers for the fall in emissions are the economic changes caused during the period of transition to a market economy in Latvia. The trend for the more recent years has been additionally affected by the effects of the global economic crisis. Within the sector, 38.7 per cent of the emissions were from the transport, followed by 25.9 per cent from the energy industries,

21.2 per cent from other sectors and 13.3 per cent from manufacturing industries and construction. Fugitive emissions from fuels (oil and natural gas) accounted for 0.8 per cent. The remaining 0.1 per cent were from other (fuel combustion).

26. Latvia has made recalculations between the 2013 and 2014 annual submissions for this sector. The two most significant recalculations made by Latvia between the 2013 and 2014 annual submissions were in the following categories: road transportation and other sectors. The recalculations were made following changes in AD (e.g. fuel split data, mileage allocation according to a more precise split of passenger cars, light-duty vehicles and heavy-duty vehicles by subgroup depending on engine volume and class), updated net calorific values (NCVs) and in order to rectify previously identified input errors. Compared with the 2013 annual submission, the recalculations decreased emissions in the energy sector by 335.78 Gg CO_2 eq (4.3 per cent), and decreased total national emissions by 2.91 per cent. The recalculations were adequately explained in the NIR.

27. Chapter 10 of the NIR provides an overview on the recalculations performed and areas improved in response to recommendations made in previous review reports. However, the list does not include all the issues regarding the energy sector. The ERT encourages the Party to organize and archive all the recommendations made in previous review reports and make an assessment of, and provide a status of implementation for, all recommendations as part of its inventory planning process.

28. The energy chapter of the NIR is generally transparent. However, the transparency of some sections could be improved through the provision of more specific underlying information. For example, the underlying reasons for the significant decrease in CH_4 emissions from the distribution of natural gas are not transparently described in the NIR (see para. 41 below).

29. In response to a question raised by the ERT during the review on the status of the current use of data collected under the European Union Emissions Trading System (EU ETS) for the verification of AD collected by CSB, Latvia indicated that, currently, there is no systematic use of EU ETS data for this purpose. To date, the EU ETS data have been applied only partly (e.g. for the CO_2 EF for used tyres when combusted for fuel). Latvia indicated that, starting with the calculations for the 2015 annual submission, this type of verification activity will be included in the inventory compilation process. The ERT encourages Latvia to use the data and parameters collected under the EU ETS to approve, improve and verify the collected AD and EFs.

30. In the 2013 annual review report, Latvia's plans to conduct an external independent review of the energy and agriculture sectors for 2013 were noted.[4] In response to a question raised by the ERT during the review regarding the outcome of this activity, Latvia informed the ERT that due to a delay in the project, the review of the energy sector inventory took place in 2014 and its results were received after the submission of the 2014 annual submission in April 2014. Therefore, the recommendations were included in the inventory improvement plan and will be implemented in the next annual inventory. The ERT commends Latvia for the activities performed and recommends that the Party include the results provided in the next annual inventory submission.

31. The uncertainty analysis performed by the Party has improved compared with the previous annual submission (by updating the values used for the calculations). However, there are still several subcategories where comparatively higher values have been used for the AD and EFs in the uncertainty assessment. For example, an uncertainty value of 50 per cent was used for the AD for residential and for natural gas distribution, as well as for the

[4] FCCC/ARR/2013/LVA, paragraph 23(b).

CO_2 EF for mobile combustion (liquid fuels) and for iron and steel production (solid fuels). The ERT recommends that Latvia perform further activities to reduce these relatively high uncertainty values for subcategories where the provision of data and associated uncertainties are of a good quality.

2. Reference and sectoral approaches

32. Table 5 provides a review of the information reported under the reference approach and the sectoral approach, as well as comparisons with other sources of international data. Issues identified in table 5 are more fully elaborated in paragraphs 33–36 below.

Table 5
Review of reference and sectoral approaches

Issue	*Expert review team assessment*	*Paragraph cross references*
Difference between the reference approach and the sectoral approach	Energy consumption: 0.06 PJ, –0.06% CO_2 emissions: 19.53 Gg CO_2, –0.29%	
Are differences between the reference approach and the sectoral approach adequately explained in the NIR and the CRF tables?	Yes	
Are differences with international statistics adequately explained?	No	See paragraph 34 below
Is reporting of bunker fuels in accordance with the UNFCCC reporting guidelines?	Yes	
Is reporting of feedstocks and non-energy use of fuels in accordance with the UNFCCC reporting guidelines?	Yes	

Abbreviations: CRF = common reporting format, NIR = national inventory report, UNFCCC reporting guidelines = "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories".

Comparison of the reference approach with the sectoral approach and international statistics

33. No major problems were identified in comparing the reference and sectoral approaches. The ERT commends Latvia for the improvements made in response to the recommendations in the 2013 annual review report.

34. There are still differences between the CRF data and the International Energy Agency (IEA) data. The data for the total apparent consumption are similar. For the years 1990–2010 the difference is less than 1 per cent of the apparent consumption; however, for the years 2011–2012, the difference is up to 2 per cent. In response to questions raised by the ERT during the review, Latvia identified a number of reasons for the possible discrepancies between both data sets. These include the use of different calorific values for natural gas (for the UNFCCC reporting, the NCV is applied, while in the CSB statistics, gross calorific values are used). Further discrepancies occur as a result of the use of information directly provided by the only natural gas supplier, Latvijas Gāze. The treatment of imported fossil waste amounts also differs slightly between both reporting systems. In response to questions raised by the ERT during the review, Latvia explained that a detailed

analysis between the CRF data and the IEA data has not been conducted. The ERT therefore reiterates the recommendation that Latvia use both the data from the Statistical Office of the European Union (Eurostat) and the IEA data to conduct QC of the CRF tables, in order to ensure consistency between the data sets, and provide a clear explanation of any differences.

International bunker fuels

35. Latvia calculates the emissions from international transport activities for aviation and navigation. The emissions vary significantly between 1990 (1,780.75 Gg CO_2 eq) and 2000 (110.03 Gg CO_2 eq). Latvia explains, in the NIR, that this big change depends on neighbouring countries' economic and international trading activities and the competitiveness of Latvian ports with other neighbouring ports in the Baltic Sea, since ports in Latvia are focused on transit cargo transport. The ERT recommends that Latvia include the relevant transport statistics in the NIR to increase the transparency of the information provided on the emission trends.

Feedstocks and non-energy use of fuels

36. No problems were identified.

3. Key categories

Stationary and mobile combustion: all fuels – CO_2

37. For most combustion-related categories, Latvia uses a higher-tier approach to calculate CO_2 emissions, in accordance with the results of its key category analysis. The country-specific EFs are derived from a guidance manual on CO_2 emissions estimation, which is attached to the NIR as annex 2. The CO_2 EFs are derived on the basis of agreed calculations using country-specific data on the carbon content of fuels and analysed NCVs. The ERT commends Latvia for this approach. However, the ERT notes that table 3.8 of the NIR indicates that for most fuels (e.g. residual fuel oil, gas/diesel oil, kerosene, lubricants, waxes, white spirit, coal, peat and solid biomass), constant EFs are applied throughout the entire time series. The ERT reiterates the recommendation made during the 2012 review that Latvia more regularly update the analysis of NCVs for the fuels used. The ERT also recommends that Latvia verify the parameters used with the measured values and reported parameters under the EU ETS.

Stationary combustion: other fuels – CO_2

38. For the calculation of CO_2 emissions from the cement industry, Latvia uses a plant-specific EF for aged tyres used as fuel. This EF dropped between 2009 and 2010 by almost 25 per cent (from 85.0 t/TJ to 60.9 t/TJ). In response to a question raised by the ERT during the review, Latvia explained that this EF has been developed by the cement company, and has been reported for the monitoring of the EU ETS and approved by the local authorities responsible. According to the EU ETS report, the CO_2 EF was recalculated for 2010, taking the natural rubber into account, as approved by the regional environment board and verifier (Bureau Veritas), which is the reason for the decrease in the value of the EF. In addition, Latvia explained that only a negligible amount of aged tyres was used as fuel in 2010. To ensure the accuracy of the emission estimates for this subcategory, the ERT recommends that Latvia apply annually updated EFs that could be obtained from the annual EU ETS report.

Stationary combustion: solid fuels, biomass – CH_4 and N_2O

39. Latvia has identified CH_4 and N_2O emissions from the use of solid fuels and biomass under other sectors as key categories. However, these emissions have been estimated using a tier 1 approach. The ERT notes that these estimates are not in accordance

with the IPCC good practice guidance because they are not based on technology-related EFs. Different combustion technologies are not taken into account when calculating the emissions due to a lack of detailed information on the energy consumption data disaggregated to the level of technology use. Even if the emissions are relatively minor, the ERT encourages Latvia to initiate activities for the provision of more detailed information on technologies and fuel consumption to ensure emission calculations that are in line with the IPCC good practice guidance.

Mobile combustion: liquid fuels – CO_2

40. The CO_2 EFs used for the calculation of emissions from gasoline vehicles under road transportation fluctuate over the time series. From 1990 to 1998, different values close to 70.0 t/TJ have been applied. From 1999 to 2008, Latvia uses a constant value of 68.6 t/TJ. For 2009 onwards, a constant value of 71.2 t/TJ is applied, which is based on measurements performed in 2009 in conjunction with the implementation of new quality standard control measures for gasoline. The ERT is of the view that no significant changes in the production of gasoline took place during the time series and that these standards are valid for Europe for the years prior to 2009. The ERT therefore encourages Latvia to reassess the application of the EF for the previous years of the time series to ensure at least a consistent calculation for 2009 onwards.

Oil and natural gas: gaseous fuels – CH_4

41. CH_4 emissions from the distribution of natural gas decreased by more than 63.5 per cent between 1990 and 2012 (from 1.03 to 0.38 Gg CH_4). The calculation uses a country-specific methodology and is provided by the Latvian gas company Latvijas Gāze. The methodology is referenced in the NIR and was provided in detail to the ERT in response a question raised during the review. However, the ERT is of the view that the underlying reasons for the significant decrease in emissions are not transparently described in the NIR. The ERT recommends that Latvia include more detailed background information in the next annual submission, such as information on the length of the pipeline and the materials used for the distribution network, the pressure conditions of the different parts of the network, flow rates and information on annual reconstruction rates to explain the improvements undertaken in the network, in order to clarify the reasons for the emission reduction in this category.

4. Non-key categories

Stationary and mobile combustion: all fuels – CO_2, CH_4 and N_2O

42. Time-series consistency is widely ensured for almost the entire energy sector. However, emissions from the category other (not specified elsewhere) are reported as "NO" (not occurring) for the years 1990–1995 under both subcategories, stationary and mobile, while emissions have been estimated and reported under the subcategory mobile for 1996 onwards. Even if the emissions are relatively minor, the ERT notes a potential issue related to the completeness and time-series consistency of the Party's inventory for the years prior to 1996. The ERT encourages Latvia to perform activities to close this gap, either by performing a study or through expert judgement.

C. Industrial processes and solvent and other product use

1. Sector overview

43. In 2012, emissions from the industrial processes sector amounted to 688.68 Gg CO_2 eq, or 6.3 per cent of total GHG emissions, and emissions from the solvent and other product use sector amounted to 48.51 Gg CO_2 eq, or 0.4 per cent of total GHG emissions.

Since 1990, emissions have increased by 15.3 per cent in the industrial processes sector, and increased by 13.0 per cent in the solvent and other product use sector. The key drivers for the rise in emissions in the industrial processes sector are the increases in cement production activity and road paving activity with asphalt, and in emissions from consumption of halocarbons and SF_6. Within the industrial processes sector, 85.4 per cent of the emissions were from mineral products, followed by 14.1 per cent from consumption of halocarbons and SF_6. The remaining 0.5 per cent were from metal production.

44. Latvia has made recalculations between the 2013 and 2014 annual submissions for the industrial processes sector. The most significant recalculations made by Latvia between the 2013 and 2014 annual submissions were in the following categories: mineral products (asphalt roofing and road paving with asphalt) and consumption of halocarbons and SF_6 (refrigeration and air-conditioning equipment) for the entire time series. The recalculations for asphalt roofing and road paving with asphalt were made following the publication of improved EFs by the European Environment Agency in 2013, while the recalculations for refrigeration and air-conditioning equipment were made following changes in AD. Compared with the 2013 annual submission, the recalculations decreased emissions in the industrial processes sector by 70.08 Gg CO_2 eq (9.6 per cent), and decreased total national emissions by 0.6 per cent. The recalculations in the solvent and other product use increased emissions by 4.13 Gg CO_2 eq (10.0 per cent), and increased total national emissions by 0.04 per cent. The recalculations were adequately explained.

45. In 2013, Latvia undertook an independent third-party assessment for the first time of the implementation of QC procedures in the Party's GHG inventory for the industrial processes and solvent and other product use sectors. The assessment examined Latvia's 2013 national inventory submission for the years 1990–2011, as well as the recommendations from the 2013 annual review report, and assessed the extent to which Latvia's QA/QC procedures for the industrial processes and solvent and other product use sectors conform to the tier 1 methods provided in the IPCC good practice guidance. A report of recommendations to improve Latvia's GHG inventory for those sectors was then compiled, which subsequently informed the Party's sector-specific improvement needs for the 2014 annual submission with regard to the industrial processes and solvent and other product use sectors. The ERT commends the Party for this initiative and encourages Latvia to periodically undertake such an independent third-party assessment.

46. In the 2013 annual review report, the ERT noted that ensuring time-series consistency is a challenge with respect to several categories in the industrial processes and solvent and other product use sectors, especially due to the lack of data for the early years of the time series. Latvia indicated in its 2014 NIR (page 399) that it is planning to undertake capacity-building projects to achieve better time-series consistency in the emission estimates within the programme "European Economic Area Financial Mechanism 2009–2014 – National Climate Policy". The ERT welcomes this planned improvement and recommends that Latvia implement it in order to achieve better time-series consistency in the emission estimates for the next annual submission.

2. Key categories

Cement production – CO_2

47. Latvia has included in its NIR (pages 172–173) a description of the mass balance approach used to estimate clinker production using a tier 2 method. This description was included following a recommendation made by the previous ERT, which identified that the cement/clinker ratio, which Latvia reported in its 2013 NIR to have used to estimate clinker production, was not used at all for this purpose. The mass balance approach estimates clinker production by subtracting the amount of additives added to the total amount of cement produced, while the amount of clinker used is estimated on the basis of a

consumption equation which takes into account production, imports, exports and stock change of clinker. Despite having included this clarification, Latvia continues to indicate in its 2014 NIR (page 170) that clinker production is estimated from the final cement type by multiplying it with the cement/clinker ratio. The current ERT considers that the use of cement production data to estimate clinker production is not in accordance with the tier 2 method provided in the IPCC good practice guidance. In response to a question raised by the ERT during the review, the Party explained that there are many types of cement produced in the cement plant and that it uses the cement/clinker ratio to determine the quantities of these different types before employing the mass balance approach. The ERT considers that Latvia has not transparently reported how the amount of clinker produced has been estimated. The ERT therefore recommends that Latvia include a clearer description of the method used to estimate clinker production in its next annual submission. The ERT further recommends that Latvia provide information on the sources of data used to estimate clinker production using the mass balance approach.

48. For 2012, Latvia has reported an average calcium oxide (CaO) content in clinker of 50.48 per cent in its NIR (pages 171–172, table 4.4). The ERT notes that, taking into account the correction factor for cement kiln dust (1.012) and clinker production (1,129.11 Gg) reported in the NIR (tables 4.4 and 4.6, respectively), the reported CaO content implies CO_2 emissions from cement production of 452.80 Gg CO_2 eq, while CRF table 2(I) on the sectoral background data reports a value of 576.63 Gg CO_2 eq for these emissions. In response to a question raised by the ERT during the review regarding this discrepancy between the CO_2 emissions from cement production reported in the NIR and the CRF tables, Latvia explained that there was a mistake in the NIR and that the correct average CaO content is 64.30 per cent, which results in CO_2 emissions of 576.63 Gg CO_2 eq, as reported in the CRF tables. The ERT recommends that Latvia provide the correct values of the average CaO content for the entire time series in its next annual submission and strengthen the implementation of QC checks to avoid these types of discrepancies between the NIR and the CRF tables.

Consumption of halocarbons and SF_6 – HFCs and SF_6

49. In the 2013 annual review report, the ERT identified inconsistencies between the data reported in CRF table 2(II)F and the NIR.[5] In response to a question raised by the ERT during the review regarding the implementation of sector-specific QC checks for the industrial processes sector, Latvia indicated that for the 2014 annual submission the quality manager from the Air and Climate Division of LEGMC performed the overall QA/QC procedures for all sectors according to the QA/QC plan. In addition, Latvia indicated that it is planning to improve the QA/QC procedures for the industrial processes sector within the framework of the programme "European Economic Area Financial Mechanism 2009–2014 – National Climate Policy". The ERT commends Latvia for its efforts regarding the implementation of its QA/QC plan for the sector, but also encourages the Party to continue improving the description in English of the methodologies used in the NIR, which will also enhance the consistency between the information reported in the NIR and the CRF tables.

3. Non-key categories

Iron and steel production – CO_2

50. Latvia produces steel from crude iron and scrap metal using open hearth furnaces (OHFs) and electric arc furnaces (EAFs). Latvia indicated in its NIR (pages 211–212) that it has estimated CO_2 emissions from the reduction of crude iron in steel-making only for

[5] FCCC/ARR/2013/LVA, paragraph 47.

those emissions arising from OHFs. To that end, Latvia has used equation 3.6B of the IPCC good practice guidance, which requires knowledge of the mass of crude iron input to the furnace and of the mass of crude steel produced from the crude iron out of the furnace. In response to a question raised by the ERT during the review, Latvia confirmed that some crude iron is used for steel-making in the EAFs, but because the two inputs required by the IPCC methodology (mass of crude iron used and mass of steel produced from crude iron) are not known for EAFs, the CO_2 emissions from EAFs have not been estimated. The ERT considers that the exclusion of crude iron in EAFs in the estimation of CO_2 emissions from production of steel constitutes a potential underestimation of emissions in this category. This issue was included in the list of potential problems and further questions raised by the ERT. Latvia submitted revised estimates and the ERT considers that the revised estimates have resolved the issue. The revised emission estimates increased the CO_2 emissions from the category metal production by 4.8 per cent (1.52 Gg CO_2 eq) for the entire first commitment period (2008–2012). However, through the exchange of views between the Party and the ERT on the possible approaches to resolve this particular issue during the period in which Latvia prepared its response to the ERT's list of potential problems, the ERT noted that Latvia faced some difficulties in estimating the CO_2 emissions from this category, in part because the Party has not been able to obtain from the plant operator all the necessary information for the 2014 annual submission. The ERT recommends that Latvia make efforts to acquire accurate and complete information regarding the amounts of carbon in the different material streams entering and leaving the process. In addition, the ERT recommends that Latvia verify the closure of the input–output carbon mass balance of the process.

Other (mineral products) – CO_2, CH_4 and N_2O

51. Latvia has reported CO_2 emissions from production of bricks in CRF table 2(I) for the period 1990–1993 differently from those reported for the period 1993–2012. While the emissions for the early years of the time series are reported in an aggregated manner, those for the more recent years of the time series are reported in a disaggregated manner for five brick plants, and using the notation key "IE" (included elsewhere) for the total CO_2 emissions from production of bricks. The estimation of the emissions from each of the five plants is thoroughly described in the NIR (pages 195–207). In the 2013 annual review report, the ERT recommended that Latvia report the aggregated brick production emissions in one line in the CRF table to avoid it being misunderstood as incomplete reporting for a single plant, and provide the supporting information in the NIR. However, Latvia has not followed this recommendation in its 2014 annual submission, and indicated in it its NIR (page 400) that this update in the CRF tables is planned for the 2015 annual submission. The ERT welcomes this planned improvement in reporting and recommends that the Party implement it in the 2015 annual submission.

Solvent and other product use – N_2O

52. Latvia has reported N_2O emissions from fire extinguishers and aerosol cans as "NO" in the CRF tables, with a comment in CRF table 3 indicating that no statistical data are available. In its 2013 annual submission, Latvia reported these emissions as "NE" (not estimated), and in response to a question raised by the 2013 ERT during the review, Latvia explained that there are no such activities in the country and confirmed that the use of the notation key "NE" in this case is incorrect, and that the notation key "NO" should be applied instead. However, in response to a question raised by the ERT during the current review regarding the comment in CRF table 3, Latvia confirmed that there are no statistical data available to estimate these emissions and that the emissions are assumed to be negligible. The ERT considers that the lack of statistical data does not necessarily confirm that this activity does not occur. The ERT encourages Latvia to estimate and report these emissions, and if the Party is unable to collect all the necessary data for this purpose, the

ERT recommends that Latvia use the notation key "NE" to report emissions from this category.

D. Agriculture

1. Sector overview

53. In 2012, emissions from the agriculture sector amounted to 2,420.30 Gg CO_2 eq, or 22.0 per cent of total GHG emissions. Since 1990, emissions have decreased by 59.2 per cent. The key drivers for the fall in emissions are the decreases in livestock numbers and the reduction in nitrogen (N) fertilizer consumption. Within the sector, 62.5 per cent of the emissions were from agricultural soils, followed by 28.4 per cent from enteric fermentation and 9.1 per cent from manure management.

54. Latvia has made recalculations between the 2013 and 2014 annual submissions for this sector. The two most significant recalculations made by Latvia between the 2013 and 2014 annual submissions were in the following categories: agricultural soils and enteric fermentation. The recalculations were made in response to the 2013 annual review report with regard to the use of different approaches to calculate the length of time for cattle grazing and following corrections made to the AD for areas of histosols. Compared with the 2013 annual submission, the recalculations increased emissions in the agriculture sector by 0.59 Gg CO_2 eq (0.03 per cent), and increased total national emissions by 0.01 per cent for 2011. The recalculations were adequately explained.

55. The inventory covers all categories and gases throughout the time series (1990–2012). The reporting is sufficiently transparent. Methodological issues and sources of AD and EFs are explained in the NIR. Latvia has implemented most of the recommendations from the 2013 annual review report regarding transparency, such as the correction of the distribution of different manure management systems for 2000,[6] including references to sources of country-specific data and the provision of a list of references in the discussion chapters of the relevant sections of the NIR. The ERT commends Latvia for this improvement; however, the ERT notes that there is still room to improve transparency (see para. 58 below).

56. The ERT identified inconsistencies in the figures reported in the CRF tables and the NIR chapters on the sector overview for the categories manure management and agricultural soils. For example, the NIR (page 255) reports that the share of enteric fermentation emissions for 1990 is close to 40 per cent, while the calculation based on CRF summary table 2 is 36.2 per cent; and the NIR reports that the share of manure management in 1990 is around 14 per cent, while the calculation based on CRF summary table 2 is 13.0 per cent. The ERT recommends that Latvia further strengthen its QA/QC procedures to eliminate any inconsistencies between the NIR and the CRF tables in its next annual submission.

57. Latvia has not reported on its efforts to correct anomalies in the AD used for the agriculture sector and the relevant data from the Food and Agriculture Organization of the United Nations (FAO), which was recommended by the ERT in the 2013 annual review report.[7] In response to questions raised by the ERT in this respect, Latvia indicated that CSB has sent updated data to FAO on fertilizer consumption for the years 2005 onwards since 2013. The ERT noted that there is no mention in the NIR of having resolved the livestock data issue with FAO. Further checks of the FAO database (FAOSTAT) indicate

[6] FCCC/ARR/2013/LVA, paragraph 56.
[7] FCCC/ARR/2013/LVA, paragraph 52.

that the issue is not completely resolved. For livestock, inter-annual variations in the data are observed in the FAOSTAT data compared with the NIR data (e.g. data for 2008 have been entered for 2010). Further, Latvia indicated that a memorandum of understanding (MOU) is being prepared between Eurostat and FAO which stipulates that FAO will obtain data from Eurostat. Latvia hopes that the implementation of the MOU will eliminate any discrepancies between the FAOSTAT data and the AD used in Latvia's national GHG inventories. The ERT therefore encourages Latvia to continue working with FAO to correct all AD for livestock and N fertilizer consumption in the FAO reporting.

2. Key categories

Enteric fermentation – CH_4

58. Following the recommendation made by the previous ERT to improve the time-series consistency for all years for manure management (which has implications for calculating the average gross energy intake), Latvia has recalculated the emissions for dairy cattle for the period 2000–2011. This has reduced CH_4 emissions from enteric fermentation by 3.78 Gg CO_2 eq for 2000 and by 5.76 Gg CO_2 eq for 2011 compared with the 2013 annual submission. However, the ERT notes that Latvia has not addressed the recommendation made in the 2013 annual review report that the Party consider reviewing the data on days in stall and days on pasture, and live weights for cattle to determine whether country-specific data may be available for all years. In response to a question raised by the ERT during the review, Latvia indicated that to estimate the length of the pasture season (tp), a parameter that is used for the tier 2 method applied, the Party proceeded as follows. For the period 1990–1999, the values of 145 days (for dairy cattle) and 185 days (for non-dairy cattle) were used because there are very limited statistics available on animal waste management systems (AWMS) for the early years of the time series and, in addition, these numbers of days best represent the agricultural practices in that period. For the more recent years of the time series (2000–2012), the Party indicated that the recommendation made in the 2013 annual review report was followed and the parameter tp was estimated on the basis of AWMS. The ERT welcomes the response provided by Latvia, but considers that the choice of tp values has not been clearly explained in the NIR. Furthermore, the ERT notes that the values estimated for tp in the period 2000–2012 have not been clearly reported in the NIR. To improve transparency, the ERT recommends that Latvia include a clearer explanation of its choice of parameter values in the NIR of its next annual submission.

59. Latvia has reported in CRF table 4.A the percentage of pregnant cattle as "NA" (not applicable), while a value of 0.1 is reported for the pregnancy coefficient (Cpregnancy) in the NIR (page 261, table 6.7). In addition, Latvia has reported in its NIR (page 260) that the net energy required for pregnancy (NEp) is corrected by 80 per cent to take into account the portion of the mature females that actually go through gestation in a year. The ERT considers that: (i) the reporting on the pregnancy coefficient is inconsistent between CRF table 4.A and the NIR; and (ii) the correction applied to the net energy required for pregnancy is not in accordance with section 4.1 of the IPCC good practice guidance since this reference cites the 80 per cent value as an example but it does not constitute an IPCC default value. In response to a question raised by the ERT during the review regarding these two issues, the Party indicated that it applies a tier 2 method to estimate CH_4 emissions from enteric fermentation using the parameters reported in the IPCC good practice guidance without any country-specific modifications. The ERT recommends that Latvia correct the identified inconsistency between CRF table 4.A and the NIR and improve the transparency in its reporting of the parameters used to estimate these emissions in the NIR. In addition, the ERT encourages Latvia to collect data on the proportion of dairy cattle that actually go through gestation in a year to improve accuracy.

Manure management – CH_4

60. Latvia has estimated CH_4 emissions from manure management for both dairy and non-dairy cattle for the entire time series, following a recommendation made in the 2013 annual review report to improve the time-series consistency of the emission estimates for the period 1990–2011. The recalculation decreased CH_4 emissions by 0.56 Gg CO_2 eq for 2011. The ERT commends Latvia for addressing the recommendation made in the 2013 annual review report to improve the time-series consistency of the emission estimates for manure management.

61. Latvia has used a tier 1 method to estimate CH_4 emissions from sheep, goats, horses, swine and poultry and a tier 2 method to estimate CH_4 emissions from cattle (dairy and non-dairy). The tier 2 CH_4 EFs for cattle were developed using IPCC default values for the methane-producing potential (Bo) and methane conversion factor (MCF). The ERT considers that this estimation method is in line with the IPCC good practice guidance. However, the ERT encourages Latvia to take steps to estimate country-specific values for Bo and MCF for manure management systems for cattle to further improve the accuracy of the emission estimates.

Manure management – N_2O

62. Latvia has estimated N_2O emissions from manure management using country-specific N excretion rates (Nex) for all animal species for each type of manure management system. The Nex values for swine (10 kg N/head/year) and for sheep (13 kg N/head/year) are lower than the IPCC default values (20 kg N/head/year and 16 kg N/head/year, respectively). Following a recommendation made in the previous review report, the Party has included in its NIR (pages 271–272) an explanation regarding the derivation of the country-specific factors, which indicates that they were derived from results of studies on the development of manure normative and livestock units carried out by the State limited company, Agrochemical Research Centre. Latvia indicated that the underlying reasons for the lower country-specific Nex values include: (i) the basis for the information on the nutrition of sheep and goats is rather poor as sheep and goats are not usually fed additionally; and (ii) mainly, a local breed of sheep and goats that is not very productive was used. The ERT considers that Latvia has sufficiently addressed the recommendation made in the 2013 annual review report.

Agricultural soils – N_2O

63. Latvia has used a tier 1a method provided in the IPCC good practice guidance to estimate direct and indirect N_2O emissions from the use of synthetic N fertilizers in agricultural soils. The ERT noted that the Party has not addressed a recommendation made in the 2013 annual review report that Latvia develop a country-specific emissions methodology for the different N-based fertilizers. In response to a question raised by the ERT during the review regarding the follow-up to this previous recommendation, the Party responded that: (i) because of the lack of financial support for research, Latvia has been unable to start developing country-specific EFs for the different N-based fertilizers; and (ii) work has been undertaken to develop a tier 2 method to estimate emissions under this category. The ERT recommends that Latvia report on the progress made towards implementing the tier 2 methodology in its next annual submission.

64. In response to a question raised by the ERT during the review regarding the availability of times-series data on different types of N-based fertilizers, Latvia provided the ERT with data on the amounts of six different N-based fertilizers used in the country in the period 2007–2012. In addition, Latvia informed the ERT that: (i) according to recent information from CSB, an MOU is being prepared between Eurostat and FAO which stipulates that FAO will obtain data from Eurostat, and it is expected that this data transfer will help to eliminate any discrepancies between the FAO and CSB data; and (ii) Latvia is

planning to address the use of limited time-series data on synthetic fertilizers within the activities of the project for improving the national inventory for 2015, entitled "Development of the national system for greenhouse gas inventory and reporting on policies, measures and projections". The ERT welcomes the fact that Latvia is continuing to work with FAO to address the issue of the non-availability of data for the period 1990–2006.

E. Land use, land-use change and forestry

1. Sector overview

65. In 2012, net removals from the LULUCF sector amounted to 12,300.54 Gg CO_2 eq. Since 1990, net removals have decreased by 38.1 per cent. The key drivers for the fall in removals are associated with the increase in the harvesting rate and the increase in the age of forests. Within the sector, 13,099.39 Gg CO_2 eq of net removals were from forest land, followed by 962.73 Gg CO_2 eq from other (land use, land-use change and forestry), and 537.73 Gg CO_2 eq from grassland. Net emissions were reported from cropland (1,381.11 Gg CO_2 eq) and from settlements (897.08 Gg CO_2 eq). Wetlands accounted for net emissions of 21.12 Gg CO_2 eq.

66. Latvia has made recalculations between the 2013 and 2014 annual submissions for this sector. The three most significant recalculations made by Latvia between the 2013 and 2014 annual submissions were in the following categories: forest land, cropland and grassland. The reasons for the recalculations in association with changes in AD include: the harmonization of the country area for the whole accounting period (see para. 67 below) and the update of the land area data by implementing research data on the distribution of extensively managed cropland that were, as Latvia explained in the NIR, sometimes wrongly reported as grassland. Recalculations were also conducted due to the application of a new national GHG accounting model for the LULUCF sector (the EPIM model) with the use of country-specific biomass expansion factors (BEFs), relative wood density and carbon content in biomass. Compared with the 2013 annual submission, the recalculations decreased removals in the LULUCF sector by 5,348.66 Gg CO_2 eq (31.1 per cent) for 2011. The recalculations were adequately explained in the NIR.

67. The ERT notes that, following the recommendations made in the 2013 annual review report, Latvia has improved the consistency of its reporting in the NIR and the CRF tables by: consistently reporting the total country area for the whole accounting period (see para. 66 above);[8] using language consistent with that contained in the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF) for the reporting under the Convention regarding land-use conversions from and to forest land;[9] and clarifying the reporting of aggregate CO_2 emissions from agricultural lime application.[10] The ERT welcomes these improvements.

68. The ERT notes that Latvia has partly implemented a number of recommendations related to transparency made in the 2013 annual review report. During the review, the ERT identified the recommendations that have not yet been addressed, as listed in the relevant paragraphs below (see paras. 69, 70 and 71 below).

[8] FCCC/ARR/2013/LVA, paragraph 69.
[9] FCCC/ARR/2013/LVA, paragraph 70.
[10] FCCC/ARR/2013/LVA, paragraph 84.

2. Key categories

Forest land remaining forest land – CO_2

69. In the 2013 annual review report, the ERT recommended that Latvia provide estimates for losses of carbon stocks in living biomass, not only for commercial fellings but also for other components such as fuelwood gathering and other losses,[11] according to the requirements of the default method provided in the IPCC good practice guidance for LULUCF, which is applied by the Party to estimate the changes in carbon stocks in litter and soil organic carbon. In response to a question raised by the ERT during the review regarding the reasons why the Party has not addressed this recommendation, Latvia indicated that although the national forest inventory (NFI) provides very accurate information, such as the destination of extracted trees, including specification, if they are cut and left in stand or cut and removed from stand, as well as if dead trees are removed from stand, it does not provide information on whether a tree is removed for timber production, fuelwood gathering or other purposes. Therefore, all artificial removals of trees, and the associated carbon losses, now take into account both commercial fellings (harvesting) and natural mortality. The ERT recommends that Latvia include this additional information in the NIR and make efforts to obtain appropriate information to estimate losses of carbon stocks in line with the IPCC good practice guidance for LULUCF.

70. Latvia has included in its NIR (chapter 9.2.4) estimates of the average carbon stocks in living biomass, following a recommendation made in the 2013 annual review report.[12] However, the Party has not provided a more detailed description of the estimates for the annual growing stock increments and how the mortality rates have been estimated,[13] which was also recommended in the previous review report. The ERT acknowledges the additional information in the NIR on the estimates of the average carbon stocks in living biomass provided by the Party and reiterates the previous recommendation that Latvia provide the above-mentioned information to increase the transparency of the reporting.

71. In the 2013 annual review report, the ERT recommended that Latvia report the carbon stock changes estimated for each of the carbon pools in its NIR, indicating how these values were estimated, taking into consideration any deviations observed from the default values provided in the IPCC good practice guidance for LULUCF.[14] Latvia has indicated in its 2014 NIR (page 407) that the preliminary data on carbon stocks were prepared after completion of the 2014 annual submission and will be provided in future NIRs. The ERT reiterates the previous recommendation that Latvia include this information in the next NIR.

Land converted to forest land – CO_2

72. Latvia has used the notation key "NO" to report the carbon stock changes in all pools under all land-use subcategories, except for gains in living biomass, dead organic matter and organic soil pools under grassland converted to forest land in CRF tables 5.A–5.F. The ERT considers that Latvia has not provided in its NIR sufficient information to justify that all pools under all land-use subcategories, except for grassland converted to forest land, are not a source of GHG emissions. In response to a question raised by the ERT requesting supporting information regarding this issue, Latvia explained that the afforesting of valuable cropland as well as the building of new drainage systems (afforestation of wetlands) are not allowed in the country; therefore, afforestation takes place generally on grassland, which is usually abandoned cropland. The afforested land is accounted for as

[11] FCCC/ARR/2013/LVA, paragraph 73.
[12] FCCC/ARR/2013/LVA, paragraph 76.
[13] FCCC/ARR/2013/LVA, paragraph 77.
[14] FCCC/ARR/2013/LVA, paragraph 78.

grassland for a certain period of time (until trees reach at least 2 m in height), because landowners may decide to return land to agricultural crop production, especially if the subsidy policy is favourable. Thus, in all cases, afforested land is accounted for as grassland before transformation to forest land. The ERT recommends that Latvia include this additional information in its next NIR to improve the transparency of the reporting.

73. In addition, Latvia has reported the carbon stock changes in mineral soils under grassland converted to forest land as "NO", and has provided information in the NIR to demonstrate that the carbon stocks in mineral soils in cropland and grassland show no difference with the carbon stocks in mineral soils on recently afforested land and historical forest land in the upper soil layer (0–40 cm). The ERT considers that this information is consistent with the use of the notation key "NO". The ERT encourages Latvia to provide figures that show that there is no statistical difference in the carbon stock changes in mineral soils under grassland converted to forest land in the next annual inventory submission.

Cropland remaining cropland – CO_2

74. In the 2013 annual review report, the ERT recommended that Latvia provide estimates for the changes in carbon stocks for the living biomass pool and avoid the use of the notation key "NO", even if a tier 1 approach is used as an interim measure.[15] Latvia has explained in its 2014 NIR (page 408) that the notation key "NO" is used on the basis of the evaluation of the statistical significance of the difference, respectively, the lack of difference between two periods. In this case, "NO" is used to demonstrate "zero" changes. The ERT reiterates the recommendation made in the previous review report that Latvia provide transparent information either to demonstrate that the statistical difference is not significant or provide estimates for the changes in carbon stocks even if a tier 1 approach is used as an interim measure.

75. In the 2013 annual review report, the ERT recommended that Latvia implement higher-tier methods using country-specific data to estimate emissions from organic soils.[16] Latvia explained in its NIR (page 409) that the project on the evaluation of emissions from organic soils was initiated in 2014 and the results will be implemented in future annual submissions. The ERT acknowledges the ongoing work to improve accuracy and encourages Latvia to implement the results as soon as they become available.

Land converted to cropland – CO_2

76. Latvia has reported losses of carbon stock in living biomass under forest land converted to cropland as "IE" for 2012 in CRF table 5.B, while it has reported values for the changes in carbon stock for all years in the period 1990–2011. However, Latvia has not explained either in CRF table 9(a) or in the NIR the reason for the use of this notation key. In response to the issue identified at previous stages of the review process, Latvia explained that emissions due to decomposition of biomass in land converted to cropland in previous years of the time series are calculated using the instant oxidation method, and, if no land-use changes take place, no emissions appear in this category. The ERT considers that the Party has not clarified the reason for using this notation key, including under which pool or category the loss of carbon is included. The ERT recommends that Latvia indicate under which category the losses of carbon stock in living biomass corresponding to forest land converted to cropland are reported, and demonstrate that the losses of carbon stock in the living biomass pool under forest land converted to cropland are not omitted. If this is not

[15] FCCC/ARR/2013/LVA, paragraph 82.
[16] FCCC/ARR/2013/LVA, paragraph 83.

possible, the ERT recommends that Latvia estimate and report the changes in carbon stock for 2012 under forest land converted to cropland instead of using the notation key "IE".

77. Latvia has reported the net carbon stock changes in dead organic matter as "NO" for 2012 in CRF table 5.B, while the changes were reported for the period 1990–2011. In addition, Latvia has reported in its NIR (pages 314–315) that the losses in dead wood are accounted for as the average stock of dead wood in a particular year. In response to the issue identified at previous stages of the review process, Latvia explained, in association with its answer to the question regarding the use of the notation key "IE" to report the losses of carbon stock in living biomass (see para. 76 above), that emissions due to decomposition of biomass in land converted to cropland in previous years of the time series are calculated using the instant oxidation method, and, if no land-use changes take place, no emissions appear in this category for living biomass, dead wood and litter. The ERT considers that Latvia has not clarified the reason for the use of the notation key "NO" and therefore recommends that the Party estimate the losses of carbon stock in dead organic matter for 2012 and report them under forest land converted to cropland in the next annual submission.

Grassland remaining grassland – CO_2

78. In the 2014 annual submission, Latvia has reported lime and dolomite application under grassland as "NO" in CRF table 5(IV) for the entire time series (1990–2012), while the notation key "IE" was used in the previous annual submission. The NIR (page 322) indicates that lime application under grassland has been reported as "NO" because: (i) limestone is not used in grassland, except for cultivated grassland used for fodder production; and (ii) fodder production has been reallocated to the category cropland. In response to a question raised by the ERT during the review, Latvia explained that in 2014 the principles followed for the calculation of cropland areas were changed and extensively managed cropland, as well as perennial grassland, was moved to the category cropland. Lime and dolomite application takes place only on cropland and perennial grassland and, therefore, this activity has been reported under cropland only. The ERT acknowledges this change and recommends that Latvia include the additional information provided to the ERT during the review in the NIR of its next annual submission.

79. In the 2014 annual submission, Latvia has estimated and reported in CRF table 5.C the carbon stock changes in dead organic matter for all years of the time series, while these changes were reported as "NO" in the previous annual submission. In response to the issues identified at previous stages of the review process regarding this change in reporting, Latvia explained that more accurate data on the accumulation of woody biomass in grassland (areas not fitting within the thresholds of forests) were obtained; therefore, the increment and accumulation of carbon in biomass were calculated and reported under this pool. Latvia further indicated that the NFI reports a very small amount of dead biomass outside forest land (the uncertainty is several times greater than the changes); therefore, the carbon stock change in dead wood stock is considered as "NO". The ERT considers that the response provided by Latvia to justify the assumption for the use of the notation key "NO" for dead biomass under this category is not an adequate explanation of the method used to calculate the removals estimated and reported values in the CRF tables. The ERT recommends that Latvia clarify, based on the NFI data, whether or not carbon stock changes in dead biomass occur in the next annual inventory report.

Settlements remaining settlements – CO_2

80. The ERT notes that in the 2014 annual submission, Latvia has estimated and reported the carbon stock changes in dead organic matter for all years of the time series, which were reported as "NO" in the previous annual submission. In response to the issues identified at previous stages of the review process, Latvia provided the same explanation

for grassland remaining grassland (see para. 79 above), namely, that the carbon stock change in dead wood stock is considered as "NO" under settlements remaining settlements, since the NFI reports a very small amount of dead biomass outside forest land (the uncertainty is several times greater than the changes); therefore, the dead wood stock is not reported. The ERT considers that the response provided by Latvia to justify the assumption for the use of the notation key "NO" for dead biomass under this category is not consistent with the Party's reporting in the CRF tables. Therefore, the ERT strongly recommends that Latvia correct this inconsistency in the estimation of removals in the next annual inventory report.

Land converted to settlements – CO_2

81. Latvia has included the description of the rationale for using the value of 244 t C ha^{-1} for the carbon stock in the soil organic carbon pool as well as the distribution of organic and mineral soils in forest land to support the areas of organic soils reported, following a recommendation made in the previous review report. The ERT commends Latvia for the additional information provided.

F. Waste

1. Sector overview

82. In 2012, emissions from the waste sector amounted to 600.07 Gg CO_2 eq, or 5.5 per cent of total GHG emissions. Since 1990, emissions have increased by 2.1 per cent. Emissions from the waste sector exhibit inter-annual fluctuations in the period 1990–2012. The key driver for the rise in emissions is population growth, while the key driver for the inter-annual variability is largely related to changes in the national economy. Within the sector, 74.7 per cent of the emissions were from solid waste disposal on land, followed by 24.7 per cent from wastewater handling, 0.5 per cent from other (waste) and 0.1 per cent from waste incineration.

83. Latvia has made recalculations between the 2013 and 2014 annual submissions for this sector. The recalculations made by Latvia between the 2013 and 2014 annual submissions were in the following categories: solid waste disposal on land and wastewater handling. The recalculations were made in response to the 2013 annual review report, and following changes in methods, AD and EFs. Compared with the 2013 annual submission, the recalculations decreased emissions in the waste sector by 3.96 Gg CO_2 eq (0.7 per cent), and decreased total national emissions by 0.03 per cent. The recalculations, including CH_4 recovery in unmanaged landfill sites under the category solid waste disposal on land (see para. 88 below), were listed in CRF table 8. The NIR (page 362) explains in the sectoral chapter only the recalculations made for wastewater handling (see para. 89 below). Latvia reported CH_4 recovery in unmanaged (deep) solid waste disposal sites (SWDS) as "NO" for 2011 in the 2013 annual submission; however, 0.07 Gg CH_4 is reported in the 2014 annual submission. The NIR (table 10.3) shows this recalculation, but no explanation is provided in the sectoral chapter on page 354. The ERT recommends that Latvia include in the NIR explanations for all categories that have been recalculated.

84. The reporting of the waste sector in the NIR is in general transparent; however, the ERT identified a lack of transparency regarding the estimation of waste density (see para. 86 below). Latvia estimates an uncertainty value of 20 per cent for the AD for municipal solid waste (MSW), based on expert judgement according to data validation from a State statistical survey without further explanation in the NIR. During the review, Latvia indicated to the ERT its willingness to resolve this issue in the next annual submission. The ERT welcomes the efforts of the Party to make this improvement.

85. Latvia reports in the NIR that through the programme "European Economic Area Financial Mechanism 2009–2014 – National Climate Policy", the Party has developed a number of improvement plans, which include: collecting detailed information on the waste balance, including types and amounts of waste that have been recovered and recycled in recent years; more detailed information on the share of non-hazardous industrial waste (e.g. construction waste) in total solid waste; the estimation of emissions from waste composting for the entire time series; the estimation of the uncertainty of the AD for MSW disposed in the period 1970–1995; and the development of country-specific parameters to implement the first-order decay (FOD) method to reduce the use of IPCC default values. The ERT welcomes these planned improvements (see paras. 86 and 92 below) and recommends that Latvia implement the results in its next annual submission.

2. Key categories

Solid waste disposal on land – CH_4

86. Latvia uses a value of 0.2 t/m^3 for the average waste density of unsorted and uncompressed waste to estimate the weight of municipal and non-hazardous solid waste disposed. Latvia has not reported in its NIR information on the method used to estimate this density value. In response to a question raised by the ERT during the review, Latvia provided the ERT with a copy of the handbook from which this value was sourced and indicated that once the corresponding research has been undertaken within the framework of the programme "European Economic Area Financial Mechanism 2009–2014 – National Climate Policy" (see para. 85 above) the corresponding information will be included in the NIR. As the handbook is written in Latvian and the results of the research were not available during the review, the ERT reiterates the recommendation made in the 2012 and 2013 annual review reports that Latvia provide in the NIR the sources of information for the methods used for estimating waste density to improve transparency.

87. Latvia uses the FOD method to estimate emissions from SWDS and has reported greater CH_4 emissions from unmanaged SWDS (15.51 Gg CH_4) than from managed SWDS (6.85 Gg CH_4) for 2012 in CRF table 6, while the AD reported in CRF table 6.A are higher for managed SWDS (525.57 Gg MSW) than for unmanaged SWDS (3.95 Gg MSW). The ERT considers that this is not in accordance with section 5.1 of the IPCC good practice guidance, which indicates that unmanaged SWDS produce fewer CH_4 emissions from a given amount of waste than managed SWDS. In addition, the CH_4 implied emission factor for unmanaged MSW exhibits a noticeable increase in the more recent years of the time series: 0.87 t/t MSW (2010), 2.95 t/t MSW (2011) and 3.69 t/t MSW (2012). The values for 2011 and 2012 are the highest among reporting Parties, which, excluding the last two extreme values, are in the range 0.003–2.01 t/t MSW. In response to a question raised by the ERT during the review regarding the comparatively higher emissions of CH_4 from unmanaged SWDS, Latvia informed the ERT that the emissions can be explained considering that: (i) 1970 is the initial year used to estimate emissions from shallow and deep unmanaged SWDS; (ii) all of the more than 500 unmanaged SWDS operating in Latvia at the beginning of the 1990s are presently closed but still emitting CH_4; and (iii) the initial year used to estimate emissions from managed SWDS sites is 2002. The ERT recommends that Latvia include this information in its NIR.

88. Latvia has reported CH_4 recovery for 2012 from both managed SWDS (6.40 Gg CH_4) and unmanaged SWDS (0.07 Gg CH_4) in CRF table 6.A. In response to a question raised by the ERT during the review regarding CH_4 recovery from unmanaged SWDS, Latvia explained that this reporting is associated with how landfills have been developed in the country: (i) the largest landfill near Riga started operating in 1969; (ii) this initial landfill operated until 2002; (iii) subsequently, the landfill was prepared for CH_4 collection; and (iv) new disposing cells have been in operation since 2002. The Party has access to the total

metered amount of landfill gas recovered from old and new cells and provided the ERT with the spreadsheets containing the data used to estimate CH_4 recovery. As it is not possible to physically disaggregate the amounts of landfill gas collected from old and new cells, Latvia has estimated the corresponding shares, recognizing that in the initial years (2002–2004) all recovered CH_4 was from the old (unmanaged) cells and estimating that in recent years (2008–2012) most of the recovered landfill gas originates from the new managed cells, while the shares in the period 2005–2007 are estimated on the basis of the assumption taking the central value between managed and unmanaged cells. As the total amount of CH_4 recovery is metered, the distribution between unmanaged and managed SWDS does not constitute a potential overestimation of CH_4 recovery. The ERT recommends that Latvia include this information in its NIR.

Wastewater handling – CH_4

89. Following a recommendation made in the 2013 annual review report, Latvia has implemented the IPCC method to estimate CH_4 emissions from its domestic and commercial wastewater and sludge using AD that allowed for the estimation of the population served by type and level of wastewater treatment and country-specific parameters such as degradable organic component, MCF and rate of CH_4 recovery. The Party previously used the "check method", which was not in accordance with the IPCC good practice guidance because it is considered only as a QC procedure for the estimated emissions. The AD for domestic sludge were also updated for the period 2008–2011. Latvia has recalculated these emissions for the entire time series (see para. 83 above). The ERT commends Latvia for these improvements.

3. Non-key categories

Waste incineration – CO_2, CH_4 and N_2O

90. Latvia has reported in CRF table 6 that emissions from waste incineration occurred in the period 1999–2012, while the AD for this category and the associated emissions for the period 1990–1998 have been reported as "NO". In response to a question raised by the ERT during the review regarding the estimation of emissions from waste incineration for the full time series, Latvia indicated that it could estimate earlier emissions that occurred between 1990 and 1998. The ERT reiterates the recommendation made in the previous review report that Latvia estimate and report emissions from waste incineration for the full time series.

91. Latvia has reported in its NIR (page 364, table 8.18) and in CRF table 6 the annual amounts of hazardous waste that have been incinerated without energy recovery, which range from 0.2 Gg (for 2009 and 2010) to 1.32 Gg (for 2001). For 2011, the reported amount is 0.0063 Gg and for 2012 it is reported as "NO". In addition, the NIR indicates that in the recent years of the time series, the hazardous waste incineration facilities did not work at full capacity and some of them were closed. In response to a question raised by the ERT during the review regarding the decreasing amounts of hazardous waste that were incinerated in the period 2008–2012, Latvia indicated that oils are incinerated with energy recovery and reused and that, according to its waste database, in 2012 hazardous waste was not incinerated without energy recovery. The ERT recommends that Latvia include in its NIR more substantive information on the nature and amounts of hazardous waste incinerated without energy purposes.

Other (composting) – CH_4 and N_2O

92. Latvia has reported emissions from composting activities for industrial and large waste treatment sites for the period 2003–2012 in CRF table 6, which have been estimated using default EFs from the *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. The Party has indicated in the NIR (page 366) that: (i) the AD for this category

only became available from 2003 onwards, when waste treatment companies started waste composting and obtained the corresponding integrated pollution prevention and control permits for this activity; (ii) emissions from household composting have been reported as "NE" for the full time series because of a lack of reliable AD; (iii) it is expected that a new waste recovery classification that entered into force in 2013 will allow for a more accurate estimation of composting; and (iv) it is envisaged that the EFs and composted amounts will be estimated within the framework of the programme "European Economic Area Financial Mechanism 2009–2014 – National Climate Policy". The ERT welcomes the development of country-specific EFs and reiterates the recommendations made in the 2012 and 2013 annual review reports that Latvia report emissions from waste composting for the entire time series.

G. Supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol

1. Information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol

Overview

93. Table 6 provides an overview of the information reported and parameters selected by Latvia under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

Table 6
Supplementary information reported under Article 3, paragraphs 3 and 4, of the Kyoto Protocol

Issue	*Expert review team assessment, if applicable*	*Findings and recommendations*
Assessment of Latvia's reporting in accordance with the requirements in paragraphs 5–9 of the annex to decision 15/CMP.1	Sufficient	See paragraphs 94–109 below
Activities elected under Article 3, paragraph 4, of the Kyoto Protocol	Activities elected: forest management Years reported: 2008, 2009, 2010, 2011, 2012	See paragraphs 106–109 below
Period of accounting		Commitment period accounting
Latvia's ability to identify areas of land and areas of land-use change in accordance with paragraph 20 of the annex to decision 16/CMP.1	Sufficient	See paragraph 67 above

94. Chapter G.1 includes the ERT's assessment of the 2014 annual submission against the Article 8 review guidelines and decisions 15/CMP.1 and 16/CMP.1. In accordance with decision 6/CMP.9, Parties will begin reporting of KP-LULUCF activities in the submissions due by 15 April 2015 using revised CRF tables, as contained in the annex to decision 6/CMP.9. Owing to this change in the CRF tables for KP-LULUCF activities, and the change from the first commitment period to the second commitment period, paragraphs

95–109 below contain the ERT's assessment of the Party's adherence to the current reporting guidelines and do not provide specific recommendations for reporting these activities in the 2015 annual submission.

95. Latvia has chosen to report land areas subject to afforestation and reforestation, deforestation and forest management using reporting method 1, approach 3 from the IPCC good practice guidance for LULUCF and has defined the country boundaries as those within which the emissions and removals from the KP-LULUCF activities are reported. The geographical location of the areas that encompass the KP-LULUCF activities were identified using a time series of Landsat images from 1990, 1995 and 2000 in combination with the NFI data collected in the period 2004–2008. Latvia has indicated in its NIR (pages 328 and 412) that linear extrapolation was used to estimate the afforested and reforested areas for the period 2010–2012 (218.72 kha) because the second NFI cycle had not been completed and validated during the compilation of the 2014 annual submission. In response to a question raised by the ERT during the review requesting provisional data (figures on AD) from the second NFI cycle to ensure that linear extrapolation has not resulted in an underestimation of emissions or an overestimation of removals, Latvia responded that the net change in the area of afforested lands between the first and second cycles of the NFI (2004–2008 and 2009–2013) amounted to, on average, 2.6 kha annually. The ERT considers that an annual net change of about 1.1 per cent, estimated on the basis of provisional data provided by Latvia, justifies the linear extrapolation as an interim measure, but reiterates the strong recommendation made in the 2013 annual review report[17] that Latvia use updated data from the second NFI cycle to calculate more reliable estimates of the areas converted to forest land in the period 2008–2012.

96. In response to the recommendation made in the previous review report,[18] Latvia improved the uncertainty estimates, including the combined level of uncertainty, in the NIR. However, no information has been provided on how the estimates are generated. The ERT reiterates the recommendation made in previous review reports that Latvia improve the transparency of its reporting on the uncertainty analysis.

97. Latvia has made recalculations for the KP-LULUCF activities between the 2013 and 2014 submissions. The impact of the recalculations was a decrease in net CO_2 removals for afforestation/reforestation from 1,007.12 Gg CO_2 eq to 25.20 Gg CO_2 eq (97.5 per cent) and a decrease in net CO_2 removals for forest management from 14,851.39 Gg CO_2 eq to 11,480.09 Gg CO_2 eq (22.7 per cent). These values are estimated using the figures in the information table entitled "Accounting for activities under Articles 3.3 and 3.4 of the Kyoto Protocol" provided in the NIR (pages 34–35). Latvia explains in the NIR that these changes are estimated using the assumption that the carbon stock in dead wood and litter will reach average values for forest land within 150 years (two average rotations in forest land) instead of the default value of 20 years. In addition, the gains and losses in living biomass have been recalculated according to updated BEFs, biomass density and carbon concentration values (see para. 66 above). The estimates were further revised by excluding areas that became forest through natural afforestation under afforestation, and by reflecting a revised area of forest management (see paras. 99 and 106 below).

Activities under Article 3, paragraph 3, of the Kyoto Protocol

Afforestation and reforestation – CO_2

98. Latvia has not provided in its NIR (pages 430–433) sufficient documentation to demonstrate that all afforestation and reforestation activities included in the identified units

[17] FCCC/ARR/2013/LVA, paragraph 107.
[18] FCCC/ARR/2013/LVA, paragraph 110.

of land are directly human-induced. The ERT notes that the information included by Latvia in its 2014 annual submission has not improved compared with the 2013 annual submission, although the 2013 annual review report recommended that the Party provide appropriate documentation. The ERT considers that this is not in accordance with section 4.2.5.2 of the IPCC good practice guidance for LULUCF, which indicates that "it is good practice to provide documentation that all afforestation and reforestation activities included in the identified units of land are direct human-induced. Relevant documentation includes forest management records or other documentation that demonstrates that a decision had been taken to replant or to allow forest regeneration by other means". In response to a question raised by the ERT during the review, Latvia explained that:

(a) According to the Forest Law of the Republic of Latvia (clause 1, para. 22), afforestation is a complex of measures for forest planting on land that is not registered as forest in the information system of the State Cadaster Register, which provides information on the total changes of forest land annually (afforestation and deforestation combined); however, disaggregated information on afforestation is not available in the Register;

(b) The complex of measures for afforestation includes, among others, the decision of a landowner to establish a new forest and the inspection by the State Forest Service that decides if the new area can be considered as afforested according to specific rules;

(c) The legal framework allows for the conversion of afforested lands back to crop production without the application of conversion tax, if the forest stand is marked as plantation forest (without a cutting age limit);

(d) The Rural Development Plan 2007–2013 considers financial support to landowners for maintaining perennial grassland instead of afforestation of their farmland; consequently, the decision of a landowner to cease maintenance of perennial grassland and to therefore no longer receive farmland-related subsidies in the future is considered as directly human-induced afforestation.

99. The ERT considers that: (i) because the State Cadaster Register does not report disaggregated information on afforestation (see para. 98(a) above), it is not a proper source to demonstrate that the reported afforested areas in the early 1990s are directly human-induced; (ii) the Forest Law entered into force on 17 March 2000 and therefore cannot be used as a source for the period prior to this date; and (iii) the Rural Development Plan is only relevant for 2007 onwards. Thus, the ERT is of the view that Latvia failed to provide the required information to demonstrate that the afforested area reported in the KP-LULUCF CRF tables is directly human-induced. As a consequence, the ERT considers that Latvia was not able to demonstrate that the afforested areas since 1990 are directly human-induced and that the Party has reported an overestimated afforestation/reforestation area and associated emissions and removals under Article 3, paragraph 3, of the Kyoto Protocol. This issue was included in the list of potential problems and further questions raised by the ERT. The ERT recommended that Latvia either provide sufficient information to demonstrate that areas subject to afforestation activities are a directly human-induced conversion of land or submit revised KP-LULUCF CRF tables by excluding any areas that became forest through natural regrowth from afforestation/reforestation in the KP-LULUCF CRF reporting tables. In response, Latvia followed the recommendation of the ERT and submitted revised estimates by excluding areas that became forest through natural afforestation from the KP-LULUCF CRF tables, reporting under afforestation only the lands afforested by planting identified as such by the NFI, and reporting the natural afforestation area under forest management under Article 3, paragraph 4, of the Kyoto Protocol as a separate land-use subcategory to account for anthropogenic GHG emissions by sources and removals by sinks in accordance with the annex to decision 16/CMP.1. The ERT considers that Latvia has adequately addressed the issue related to the assumption that

natural afforested areas were directly human-induced and that the revised estimates have resolved the issue. The revised estimates decreased net CO_2 removals from the category afforestation and reforestation by 91.6 per cent (1,269.26 Gg CO_2) for the entire first commitment period (2008–2012).

100. Latvia has reported the changes in carbon stocks in mineral soils as "NO". In the 2013 annual review report, the ERT recommended that Latvia either provide estimates for this pool using a higher-tier method or demonstrate that the pool is not a source.[19] Latvia has reported in its 2014 NIR (pages 303, 304 and 428) that recent research data demonstrate that no carbon stock changes in mineral soils occur due to conversion to forest land. The ERT acknowledges the new evidence provided by the Party and recommends that Latvia provide figures that demonstrate no statistically significant difference in the carbon stock in mineral soils in historical grassland and afforested land as an annex to the next NIR.

101. Latvia has reported the losses in the carbon stock changes in above- and below-ground biomass as "NO" in KP-LULUCF CRF table 5(KP-I)A.1.1. Latvia has indicated in its NIR (page 427) and in response to the issue identified at previous stages of the review process that, according to the NFI data, no harvesting activities take place in afforested land, which can be easily explained by the young age of these stands. Normally, at that age only early tending is performed. Additionally, if, by any reason, harvesting took place on the afforested area it is also reported in the national statistics and is included in the forest management related carbon stock changes. Therefore, there is no risk of an underestimation of emissions from living biomass. The ERT accepts the explanation and recommends that Latvia include it in the next NIR.

Deforestation – CO_2

102. Latvia has reported emissions from dolomite used in deforestation as "IE" in KP-LULUCF CRF table 5(KP-II)4. In response to issues identified at previous stages of the review process, Latvia indicated that the national statistics do not disaggregate different liming materials: therefore, all carbonate-based materials are reported under limestone. The ERT acknowledges the rationale for the use of the notation key "IE" and encourages Latvia to make efforts to estimate and report emissions from limestone and dolomite application separately.

103. The ERT notes that, following a recommendation made in the 2013 annual review report[20] regarding the use of higher-tier methods, Latvia has recalculated the gains and losses in living biomass according to the updated BEFs, biomass density, carbon concentration values and mortality rates for the most common species. The ERT welcomes these improvements, which are in line with the IPCC good practice for LULUCF for the key categories.

104. In the 2013 annual review report, the ERT recommended that Latvia provide additional information justifying the reasons why some areas that meet the definition of forest are reported as non-forest land.[21] In its list of responses to the review process (NIR, table 10.6, page 416), Latvia indicated that specified areas are not reported under forest management as they are not supposed to be or considered as managed forests, respectively, subject to the Forest Law. The ERT recommends that Latvia include the specific exclusions in the definition of forest and any other criteria provided in the NIR (chapter 11.1.1) in the next annual submission.

[19] FCCC/ARR/2013/LVA, paragraph 117.
[20] FCCC/ARR/2013/LVA, paragraph 118.
[21] FCCC/ARR/2013/LVA, paragraph 119.

105. The 2013 annual review report recommended that Latvia provide estimates of specific harvesting losses for the areas deforested.[22] Latvia indicated in the NIR (page 427) that expert judgement was applied to separate emissions from living biomass due to commercial harvesting following deforestation. However, the ERT notes that supporting documentation for the expert judgement is not provided. According to the IPCC good practice guidance for LULUCF, expert judgement is a "carefully considered, well-documented qualitative or quantitative judgement made in the absence of unequivocal observational evidence by a person or persons who have a demonstrable expertise in the given field" (page G9, annex A). The ERT recommends that Latvia seek to provide adequate documentation to support the expert judgement, for example by filling in table 2A.1 provided in the IPCC good practice guidance for LULUCF (page 2.23).

Activities under Article 3, paragraph 4, of the Kyoto Protocol

Forest management – CO_2

106. Latvia has reported the total area of land at the end of 2011 as 6,456.24 kha in KP-LULUCF CRF table NIR-2; however, the Party has reported that the total area of land at the beginning of 2012 is 6,458.29 kha. The ERT noted that this gap is due to the reported area of forest management at the beginning of 2012, which is 2.05 kha bigger than the area at the end of 2011. During the review, Latvia agreed that this is a mathematical error in the land matrix tables. In response to a question raised by the ERT during the review on the possible overestimation of removals from forest management, Latvia provided a revised estimate of removals from forest management for 2012, which was 4.32 Gg CO_2 eq lower than the value reported in KP-LULUCF CRF table NIR-2. This issue was included in the list of potential problems and further questions raised by the ERT, and the ERT recommended that Latvia make the corresponding changes in the related KP-LULUCF CRF tables and submit revised estimates of CO_2 emissions/removals from forest management. In response to the list of potential problems and further questions raised by the ERT, Latvia recalculated the area of forest management for the whole time series as a result of the revised area of directly human-induced afforestation and incorporated the remaining afforestation under the forest management area. The ERT considers that Latvia has reported consistent areas for forest management over the time series in the resubmitted KP-LULUCF CRF tables and that the revised estimates have resolved the issue. The ERT considers that the information provided in the annex to the response from Latvia ("Afforestation study SP") justifies that the recalculated areas meet the requirements of definitions in decision 16/CMP.1, and recommends that Latvia include that information in the next annual submission. The revised estimates of net CO_2 removals reported in KP-LULUCF CRF table 5(KP-I)B.1 increased the net CO_2 removals from the activity forest management by 2.4 per cent (from 12,613.49 Gg CO_2 to 12,913.55 Gg CO_2) for the entire first commitment period (2008–2012).

107. Latvia has reported the carbon stock changes in litter and mineral soils as "NO" in KP-LULUCF CRF table 5(KP-I)B.1. In response to issues identified at previous stages of the review process, Latvia provided the results from the BioSoil project (95 plots) to demonstrate that there is no statistically significant difference in the total carbon stock between 2006 and 2012; therefore, the litter and mineral soils pools are not a source. The ERT welcomes this additional information and encourages Latvia to provide information in the NIR on the data derived from the BioSoil project, explaining that the 95 plots are statistically representative of different conditions in forest management (e.g. practices of intensification, changes in harvesting practices, etc.) or demonstrate that the forest

[22] FCCC/ARR/2013/LVA, paragraph 121

management area does not experience significant changes in management regimes or disturbances.

108. In the 2013 annual review report, the ERT recommended that Latvia estimate the carbon losses due to harvesting that took place on afforested/reforested areas and on forest management areas separately and transparently report this issue.[23] Although Latvia has acknowledged this issue as one of the points for improvement, the ERT notes that harvesting emissions continue to be reported entirely under forest management and no mention is made in the NIR about the necessary improvement. The ERT reiterates the recommendation from the previous review report that Latvia report this issue transparently in the next NIR.

Biomass burning – CO_2

109. Latvia has reported CO_2 emissions from controlled burning as "IE" under forest management in KP-LULUCF CRF table 5(KP-II)5. In response to issues identified at previous stage of the review process, Latvia explained that CO_2 emissions from controlled burning are included in the estimation of decomposition of harvesting residues, considering instant oxidation for part of the biomass actually mineralized, and two years of decomposition for the biomass left for incineration, but not burned. The ERT acknowledges the explanation and recommends that the Party include it in the next NIR.

2. Information on Kyoto Protocol units

Standard electronic format and reports from the national registry

110. Latvia has reported information on its accounting of Kyoto Protocol units in the required SEF tables, as required by decisions 15/CMP.1 and 14/CMP.1. The ERT took note of the findings and recommendations included in the standard independent assessment report (SIAR) on the SEF tables and the SEF comparison report.[24] The SIAR was forwarded to the ERT prior to the review, pursuant to decision 16/CP.10. The ERT reiterated the main findings and recommendations contained in the SIAR.

111. Information on the accounting of Kyoto Protocol units has been prepared and reported in accordance with decision 15/CMP.1, annex, chapter I.E, and reported in accordance with decision 14/CMP.1 using the SEF tables. This information is consistent with that contained in the national registry and with the records of the international transaction log (ITL) and the clean development mechanism registry and meets the requirements referred to in decision 22/CMP.1, annex, paragraph 88(a–j). The transactions of Kyoto Protocol units initiated by the national registry are in accordance with the requirements of the annex to decision 5/CMP.1 and the annex to decision 13/CMP.1. No discrepancy has been identified by the ITL and no non-replacement has occurred. The national registry has adequate procedures in place to minimize discrepancies.

Accounting of activities under Article 3, paragraph 3, of the Kyoto Protocol and any elected activities under Article 3, paragraph 4, of the Kyoto Protocol

112. Latvia has reported information on its accounting of KP-LULUCF in the accounting table, as included in the annex to decision 6/CMP.3. Information on the accounting of KP-LULUCF has been prepared and reported in accordance with decisions 16/CMP.1 and 6/CMP.3.

[23] FCCC/ARR/2013/LVA, paragraph 125.

[24] The SEF comparison report is prepared by the international transaction log (ITL) administrator and provides information on the outcome of the comparison of data contained in the Party's SEF tables with corresponding records contained in the ITL.

113. Table 7 shows the accounting quantities for KP-LULUCF as reported by the Party and the final values after the review.

Table 7

Accounting quantities for activities under Article 3, paragraph 3, and, if any, activities under Article 3, paragraph 4, of the Kyoto Protocol, in t CO_2 eq

	2014 annual submission[a]		
	As reported	*Revised estimates*	*Final accounting quantity*[b]
Afforestation and reforestation			
Non-harvested land	–1 385 161	–115 897	–115 897
Harvested land	NA, NO		NA, NO
Deforestation	6 224 420		6 224 420
Forest management	–11 072 592	–12 341 856	–12 341 856
Article 3.3 offset[c]	–4 839 259	–6 10[illegible]523	–6 108 523
Forest management cap[d]	–6 233 333		–6 233 333
Cropland management	NA	NA	NA
Grazing land management	NA	NA	NA
Revegetation	NA	NA	NA

Abbreviations: CRF = common reporting format, KP-LULUCF = land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, NA = not applicable, NO = not occurring.

[a] The values included under the 2014 annual submission are the cumulative accounting values for 2008, 2009, 2010, 2011 and 2012, as reported in the accounting table of the KP-LULUCF CRF tables for the inventory year 2012.

[b] The "final accounting quantity" is the quantity of Kyoto Protocol units that the Party shall issue or cancel under each activity under Article 3, paragraph 3, and paragraph 4, if relevant, based on the final accounting quantity in the 2014 annual submission.

[c] "Article 3.3 offset": for the first commitment period, a Party included in Annex I to the Convention that incurs a net source of emissions under the provisions of Article 3, paragraph 3, of the Kyoto Protocol may account for anthropogenic greenhouse gas emissions by sources and removals by sinks in areas under forest management under Article 3, paragraph 4, up to a level that is equal to the net source of emissions under the provisions of Article 3, paragraph 3, but not greater than 9.0 megatonnes of carbon times five, if the total anthropogenic greenhouse gas emissions by sources and removals by sinks in the managed forest since 1990 is equal to, or larger than, the net source of emissions incurred under Article 3, paragraph 3.

[d] In accordance with decision 16/CMP.1, annex, paragraph 11, for the first commitment period only, additions to and subtractions from the assigned amount of a Party resulting from forest management under Article 3, paragraph 4, of the Kyoto Protocol after the application of decision 16/CMP.1, annex, paragraph 10, and resulting from forest management project activities undertaken under Article 6, shall not exceed the value inscribed in the appendix of the annex to decision 16/CMP.1, times five.

114. Based on the information provided in table 7 for the activity afforestation and reforestation, Latvia shall: for non-harvested land, issue 115,897 removal units (RMUs) in its national registry; for harvested land, neither issue nor cancel any units in its national registry.

115. Based on the information provided in table 7 for the activity deforestation, Latvia shall cancel 6,224,420 assigned amount units, emission reduction units, certified emission reduction units and/or RMUs in its national registry.

116. Based on the information provided in table 7 for the activity forest management, Latvia shall issue 12,341,856 RMUs in its national registry.

Calculation of the commitment period reserve

117. Latvia has reported its commitment period reserve in its 2014 annual submission. The ERT notes that, in response to questions raised by the ERT during the review, Latvia reported its commitment period reserve to be 54,898.239 t CO_2 eq based on the national emissions in its most recently reviewed inventory (10,979.65 Gg CO_2 eq). The ERT agrees with this figure (see also para. 22 above).

3. Changes to the national system

118. Latvia reported that there are changes in its national system since the previous annual submission. The Latvia University of Agriculture is responsible for compiling the agriculture sector inventory, according to Cabinet of Ministers Regulation No. 217 ("Regulations regarding the national inventory system of greenhouse gas emission units"). The changes to the national system described by the Party include: the establishment of the GHG Research Working Group, with approval by the Latvia University of Agriculture Rector's order, to better organize the work related to the compiling of the agriculture sector inventory; and the organization of monthly group meetings at the University with representatives from MoA and MEPRD. For the 2014 annual submission, a quality manager from the LEGMC Air and Climate Division performed the QA/QC procedures for all sectors according to the QA/QC plan in the NIR (chapter 13, page 436). The ERT concluded that the Party's national system continues to be in accordance with the requirements of national systems outlined in decision 19/CMP.1.

4. Changes to the national registry

119. Latvia reported that there are changes in its national registry since the previous annual submission. The Party described in the NIR the changes to the database structure and capacity of its national registry, as well as the conformance of the national registry to technical standards, and the test results of the registry, which were limited and only affected EU ETS functionality. The ERT noted that, although the Party stated that changes were made regarding the information on the registry administrators, it has not clearly identified what changes have been made (e.g. whether the changes relate to contact details, Registry System Administrator, etc.). The ERT also noted that the changes to the publicly available information are not well described. The ERT recommends that Latvia clarify what changes have been made in its next annual submission.

120. The ERT concluded that, taking into account the confirmed changes in the national registry, Latvia's national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1 and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP). The ERT recommends that Latvia include all other additional information in response to the SIAR findings in its NIR in accordance with decision 15/CMP.1, annex, chapter I.G.

5. Minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol

121. Consistent with paragraph 23 of the annex to decision 15/CMP.1, Latvia provided information related to how it is striving, under Article 3, paragraph 14, of the Kyoto Protocol, to implement its commitments in such a way as to minimize adverse social, environmental and economic impacts on developing country Parties, particularly those identified in Article 4, paragraphs 8 and 9, of the Convention.

122. The ERT noted that in 2012, Latvia launched a comprehensive energy policy reform project entitled "Energy long-term strategy 2030 – competitive economy for community"; approved amendments of laws and regulations; continued to open markets for electric

energy; and determined that regulated tariffs are applied only to households. This project also offered a vision for the sustainable production of electric energy from renewable energy sources, the production of electric energy from cogeneration and further biofuel development. Within the framework of the reforms, a system to allow households to transfer renewable electricity to the network and back has been launched.

123. The ERT also noted that in 2012 Latvia implemented a project entitled "Support to Moldova's Northern Regional Development Agency and Regional Development Council with the updating of the Regional Development Strategy". Within the framework of the project, Latvia provided support in updating the Republic of Moldova's Northern Regional Development Strategy for 2010–2016, as part of which experts from MEPRD provided methodological support to improve the Republic of Moldova's Northern Regional Development Programme, including in matters related to energy efficiency, monitoring and business.

124. Latvia did not explicitly provide information on changes in its reporting of the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol in its annual submission. However, the ERT noted that the descriptions of the measures discussed in paragraphs 122 and 123 above fully replaced the previously reported general information on: (i) efforts regarding energy price reforms within the European Union market and related fiscal initiatives; and (ii) how Latvia did not report any support activities for developing country Parties in the 2012 NIR (and which were reported as unchanged in the 2013 NIR). The ERT concluded that, taking into account the confirmed changes in the reporting, the information provided is complete and transparent. The ERT recommends that the Party, in its annual submission, explicitly report any change(s) in its information provided under Article 3, paragraph 14, in accordance with decision 15/CMP.1, annex, chapter I.H.

III. Conclusions and recommendations

A. Conclusions

125. Table 8 summarizes the ERT's conclusions on the 2014 annual submission of Latvia, in accordance with the Article 8 review guidelines.

Table 8
Expert review team's conclusions on the 2014 annual submission of Latvia

Issue	*Expert review team assessment*	*Paragraph cross references for identified problems*
The ERT concludes that the inventory submission of Latvia is complete with regard to categories, gases, years and geographical boundaries and contains both an NIR and CRF tables for 1990–2012		
Annex A sources[a]	Complete	
LULUCF[a]	Complete	
KP-LULUCF	Complete	
The ERT concludes that the inventory submission of Latvia has been prepared and reported in accordance with the UNFCCC reporting guidelines	Yes	

Issue	*Expert review team assessment*	*Paragraph cross references for identified problems*
Latvia's inventory is in accordance with the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF	Generally	16, 18
The submission of information required under Article 7, paragraph 1, of the Kyoto Protocol has been prepared and reported in accordance with decision 15/CMP.1	Yes	
Latvia has reported information on its accounting of Kyoto Protocol units in accordance with decision 15/CMP.1, annex, chapter I.E, and used the required reporting format tables as specified by decision 14/CMP.1	Yes	
The national system continues to perform its required functions as set out in the annex to decision 19/CMP.1	Yes	
The national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1 and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant CMP decisions	Yes	
Did Latvia provide information in the NIR on changes in its reporting of the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol?	No	124

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, CMP = Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol, CRF = common reporting format, ERT = expert review team, IPCC = Intergovernmental Panel on Climate Change, IPCC good practice guidance = IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, IPCC good practice guidance for LULUCF = IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry*, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = land use, land-use change and forestry, NIR = national inventory report, Revised 1996 IPCC Guidelines = *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, UNFCCC reporting guidelines = "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories".

[a] The assessment of completeness by the ERT considers only the completeness of reporting of mandatory categories (i.e. categories for which methods and default emission factors are provided in the Revised 1996 IPCC Guidelines, the IPCC good practice guidance or the IPCC good practice guidance for LULUCF).

B. Recommendations

126. The ERT identified the issues for improvement listed in table 9. All recommendations are for the next annual submission, unless otherwise specified. The ERT notes that this review report of the 2014 annual submission will be published after 15 April 2015. Where recommendations cannot be fully implemented in time for the 2015 annual submission, the ERT recommends that the Party provide an update on progress of implementation in the NIR.

Table 9
Recommendations identified by the expert review team

Sector	*Category (cross-cutting issue)*	*Recommendation*	*Reiteration of previous recommendation?*	*Paragraph cross references*
Cross-cutting	QA/QC	Allocate sufficient resources for the implementation of the QA/QC plan, but especially with regard to the QC activities performed by the inventory compilers preparing the NIR and CRF tables	No	14
	Inventory preparation	Report the key categories in accordance with the IPCC good practice guidance, and consistently report the results in the NIR and the CRF tables	No	16
		Allocate sufficient time and human resources to the final stages of the inventory compilation process in which cross-sectoral work such as the key category analysis occurs, and enhance the QC procedures so that errors are avoided in future annual submissions	No	16
		Report the uncertainties associated with the total national emission estimates based on equation 6.4 of the IPCC good practice guidance	No	18
	Inventory management	Correct the error in the reporting of emissions from consumption of halocarbons and SF_6	No	22
		Strengthen the QC checks to adequately track any changes in the reporting between the original submission and the successive resubmissions, if any, of the national inventory	No	22
Energy	General	Include the results of the implementation of the recommendations from the external independent review conducted in 2014	No	30
		Perform further activities to reduce the relatively high uncertainty values for subcategories where the provision of data and associated uncertainties are of a good quality	No	31
	Reference and sectoral approaches	Use both the Eurostat data and the IEA data to conduct QC of the CRF tables, in order to ensure consistency between the data sets, and provide a clear explanation of any differences	Yes	34
	International bunker fuels	Include relevant transport statistics to increase the transparency of the information provided on the emission trends of international transport activities for aviation and navigation	No	35
	Stationary and mobile combustion: all	More regularly update the analysis of NCVs for the fuels used	Yes	37

Sector	*Category cross-cutting issue*	*Recommendation*	*Reiteration of previous recommendation?*	*Paragraph cross references*
	fuels – CO_2			
		Verify the parameters used with the measured values and reported parameters under the EU ETS	No	37
	Stationary combustion: other fuels – CO_2	Apply annually updated CO_2 EFs for the combustion of used tyres in the cement industry that could be obtained from the annual EU ETS report	No	38
	Oil and natural gas: gaseous fuels – CH_4	Include more detailed background information to explain the improvements undertaken in the distribution network to clarify the reasons for the emission reduction in this category	No	41
Industrial processes and solvent and other product use	General	Implement the capacity-building project to achieve better time-series consistency in the emission estimates	Yes	46
	Cement production – CO_2	Include a clearer description of the method used to estimate clinker production	No	47
		Provide information on the sources of data used to estimate clinker production using the mass balance approach	No	47
		Provide the correct values of the average calcium oxide content for the entire time series and strengthen the implementation of QC checks to avoid discrepancies between the NIR and the CRF tables	No	48
	Iron and steel production – CO_2	Make efforts to acquire accurate and complete information regarding the amounts of carbon in the different material streams entering and leaving the process	No	50
		Verify the closure of the input–output carbon mass balance of the process	No	50
	Other (mineral products) – CO_2, CH_4 and N_2O	Report the aggregated brick production emissions in one line in CRF table 2(I)	Yes	51
	Solvent and other product use – N_2O	Use the notation key "NE" to report N_2O emissions from fire extinguishers and aerosol cans	No	52
Agriculture	QA/QC	Further strengthen the QA/QC procedures to eliminate any inconsistencies between the NIR	No	56

Sector	Category cross-cutting issue	Recommendation	Reiteration of previous recommendation?	Paragraph cross references
		and the CRF tables		
	Enteric fermentation – CH_4	Include a clearer explanation of the choice of parameter value for length of pasture season (tp)	No	58
		Correct the inconsistency between CRF table 4.A and the NIR in the reporting of the pregnancy coefficient (Cpregnancy) and improve the transparency in the reporting of the parameters used to estimate these emissions	No	59
	Agricultural soils – N_2O	Report on the progress made towards implementing the tier 2 methodology	No	63
LULUCF	Forest land remaining forest land – CO_2	Include in the NIR the additional information on artificial removal of trees that was provided to the ERT	No	69
		Provide a more detailed description of the estimates for the annual growing stock increments and the estimation of mortality rates	Yes	70
		Report the carbon stock changes estimated for each of the carbon pools in the NIR, indicating how these values were estimated, taking into consideration any deviations observed from the default values provided in the IPCC good practice guidance for LULUCF	Yes	71
	Land converted to forest land – CO_2	Include the additional information provided to the ERT justifying that all pools under all land-use subcategories, except for grassland converted to forest land, are not a source of GHG emissions	No	72
	Cropland remaining cropland – CO_2	Provide transparent information on the use of the notation key "NO" to report the changes in carbon stocks for the living biomass pool by demonstrating that the statistical difference is not significant, or provide estimates at least using a tier 1 approach as an interim measure	Yes	74
	Land converted to cropland – CO_2	Indicate under which category the losses of carbon in living biomass corresponding to forest land converted to cropland are reported and demonstrate that the losses of carbon stock in the living biomass pool under forest land converted to cropland are not omitted	No	76
		Estimate and report the changes in carbon stock for 2012 instead of using the notation key "IE"	No	76

Sector	*Category cross-cutting issue*	*Recommendation*	*Reiteration of previous recommendation?*	*Paragraph cross references*
		Estimate the losses of carbon stock in dead organic matter for 2012 and report them under forest land converted to cropland	No	77
	Grassland remaining grassland – CO_2	Include in the NIR the additional information provided to the ERT that the application of lime and dolomite takes place only on cropland and perennial grassland and the associated reporting of these emissions under cropland	No	78
		Clarify, based on data from the NFI, whether carbon stock changes in dead biomass occur	No	79
	Settlements remaining settlements – CO_2	Correct the inconsistency between the estimated and reported values of carbon stock changes in dead organic matter and the information provided in the NFI	No	80
Waste	General	Provide explanations in the NIR for all categories that have been recalculated	No	83
		Implement the results of the programme "European Economic Area Financial Mechanism Programme 2009–2014 – National Climate Policy", which involves a number of improvements for the waste sector	No	85
	Solid waste disposal on land – CH_4	Provide in the NIR the sources of information for the methods used for estimating waste density	Yes	86
		Include in the NIR the information provided to the ERT on the comparatively higher emissions from unmanaged solid waste disposal sites	No	87
		Include in the NIR the information provided to the ERT on CH_4 recovery from unmanaged solid waste disposal sites	No	88
	Waste incineration – CO_2, CH_4 and N_2O	Estimate and report these emissions for the full time series	Yes	90
		Include in the NIR more substantive information on the nature and amounts of hazardous waste incinerated	No	91
	Other (composting) – CH_4 and N_2O	Estimate and report these emissions for the entire time series	Yes	92
Article 3, paragraphs 3 and 4	General	Use updated data from the second cycle of the NFI to calculate more reliable estimates of the	Yes	95

Sector	*Category/cross-cutting issue*	*Recommendation*	*Reiteration of previous recommendation?*	*Paragraph cross references*
of the Kyoto Protocol		areas converted to forest land in the period 2008–2012		
	Afforestation and reforestation – CO_2	Provide figures that demonstrate no statistically significant difference in the carbon stock in mineral soils in historical grassland and afforested land	No	100
		Include the explanation provided to the ERT on the reasons for reporting the carbon stock changes in above- and below-ground biomass as "NO"	No	101
	Deforestation – CO_2	Include the specific exclusions in the definition of forest and any other criteria provided in the NIR	Yes	104
		Provide adequate documentation to support the expert judgement applied to separate emissions from living biomass due to commercial harvesting following deforestation	No	105
	Forest management – CO_2	Include in the NIR the information provided in the annex to the response from Latvia ("Afforestation study SP") that justifies that the recalculated areas meet the requirements of definitions in decision 16/CMP.1	Yes	106
		Report the carbon losses due to harvesting that took place on afforested/reforested areas and on forest management separately and report this issue transparently	Yes	108
	Biomass burning – CO_2	Include the explanation regarding the use of the notation key "IE" to report CO_2 emissions from controlled burning	No	109
Standard electronic format and reports from the national registry		Address the recommendations contained in the SIAR	No	110
National registry		Clarify what changes have been made to the national registry	No	119
		Include all other additional information in response to the SIAR findings in the NIR in accordance with decision 15/CMP.1	No	120
Article 3, paragraph 14, of the Kyoto Protocol		Explicitly report any change(s) in the information provided under Article 3, paragraph 14, of the Kyoto Protocol in accordance with decision 15/CMP.1	No	124

Abbreviations: CRF = common reporting format, EF = emission factor, ERT = expert review team, EU ETS = European Union Emissions Trading System, GHG = greenhouse gas, IE = included elsewhere, IEA = International Energy Agency, IPCC = Intergovernmental Panel on Climate Change, IPCC good practice guidance = IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, IPCC good practice guidance for LULUCF = IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry*, LULUCF = land use, land-use change and forestry, NCV = net calorific value, NE = not estimated, NFI = national forest inventory, NIR = national inventory report, NO = not occurring, QA/QC = quality assurance/quality control, SIAR = standard independent assessment report.

IV. Questions of implementation

127. No questions of implementation were identified by the ERT during the review.

Annex I

Information to be included in the compilation and accounting database

Table 10
Information to be included in the compilation and accounting database in t CO_2 eq for 2012, including the commitment period reserve

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Commitment period reserve	54 892 386	54 898 239		54 898 239
Annex A emissions for 2012				
CO_2	7 433 729	7 434 900		7 434 900
CH_4	1 631 101			1 631 101
N_2O	1 816 309			1 816 309
HFCs	83 650			83 650
PFCs	NA, NO			NA, NO
SF_6	13 688			13 688
Total Annex A sources[c]	**10 978 477**	**10 979 648**		**10 979 648**
Activities under Article 3, paragraph 3, for 2012				
3.3 Afforestation and reforestation on non-harvested land for 2012	–327 403	–27 337		–27 337
3.3 Afforestation and reforestation on harvested land for 2012	NA, NO			NA, NO
3.3 Deforestation for 2012	1 190 099			1 190 099
Activities under Article 3, paragraph 4, for 2012[d]				
3.4 Forest management for 2012	–12 447 605	–12 747 671		–12 747 671
3.4 Cropland management for 2012				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2012				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2012				
3.4 Revegetation for the base year				

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, NA = not applicable, NO = not occurring.

[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

[b] "Final" includes revised estimates, if any, and/or adjustments, if any.

[c] The values for "Total Annex A sources" in the columns "As reported", "Revised estimates" and "Final" may not equal the sum of the values for the gases in those columns owing to rounding.

[d] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Table 11
Information to be included in the compilation and accounting database in t CO_2 eq for 2011

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2011				
CO_2	7 750 862	7 751 163		7 751 163
CH_4	1 566 625			1 566 625
N_2O	1 734 937			1 734 937
HFCs	75 011			75 011
PFCs	NA, NO			NA, NO
SF_6	12 454			12 454
Total Annex A sources[c]	**11 139 889**	**11 140 190**		**11 140 190**
Activities under Article 3, paragraph 3, for 2011				
3.3 Afforestation and reforestation on non-harvested land for 2011	–301 559	–25 202		–25 202
3.3 Afforestation and reforestation on harvested land for 2011	NA, NO			NA, NO
3.3 Deforestation for 2011	1 215 933			1 215 933
Activities under Article 3, paragraph 4, for 2011[d]				
3.4 Forest management for 2011	–11 203 730	–11 480 086		–11 480 086
3.4 Cropland management for 2011				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2011				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2011				
3.4 Revegetation for the base year				

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, NA = not applicable, NO = not occurring.

[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

[b] "Final" includes revised estimates, if any, and/or adjustments, if any.

[c] The values for "Total Annex A sources" in the columns "As reported", "Revised estimates" and "Final" may not equal the sum of the values for the gases in those columns owing to rounding.

[d] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Table 12
Information to be included in the compilation and accounting database in t CO_2 eq for 2010

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2010				
CO_2	8 500 379	8 500 385		8 500 385
CH_4	1 654 841			1 654 841
N_2O	1 747 771			1 747 771
HFCs	72 182			72 182
PFCs	NA, NO			NA, NO
SF_6	12 254	13 129		13 129
Total Annex A sources[c]	**11 987 427**	**11 988 308**		**11 988 308**
Activities under Article 3, paragraph 3, for 2010				
3.3 Afforestation and reforestation on non-harvested land for 2010	–276 747	–23 150		–23 150
3.3 Afforestation and reforestation on harvested land for 2010	NA, NO			NA, NO
3.3 Deforestation for 2010	1 228 893			1 228 893
Activities under Article 3, paragraph 4, for 2010[d]				
3.4 Forest management for 2010	–10 908 706	–11 162 303		–11 162 303
3.4 Cropland management for 2010				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2010				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2010				
3.4 Revegetation for the base year				

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, NA = not applicable, NO = not occurring.

[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

[b] "Final" includes revised estimates, if any, and/or adjustments, if any.

[c] The values for "Total Annex A sources" in the columns "As reported", "Revised estimates" and "Final" may not equal the sum of the values for the gases in those columns owing to rounding.

[d] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Table 13
Information to be included in the compilation and accounting database in t CO_2 eq for 2009

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2009				
CO_2	7 418 270	7 418 265		7 418 265
CH_4	1 659 272			1 659 272
N_2O	1 684 107			1 684 107
HFCs	74 352	74 368		74 368
PFCs	NA, NO			NA, NO
SF_6	13 529			13 529
Total Annex A sources[c]	**10 849 531**	**10 849 542**		**10 849 542**
Activities under Article 3, paragraph 3, for 2009				
3.3 Afforestation and reforestation on non-harvested land for 2009	–252 997	–21 190		–21 190
3.3 Afforestation and reforestation on harvested land for 2009	NA, NO			NA, NO
3.3 Deforestation for 2009	1 271 795			1 271 795
Activities under Article 3, paragraph 4, for 2009[d]				
3.4 Forest management for 2009	–15 052 222	–15 284 029		–15 284 029
3.4 Cropland management for 2009				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2009				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2009				
3.4 Revegetation for the base year				

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, NA = not applicable, NO = not occurring.

[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

[b] "Final" includes revised estimates, if any, and/or adjustments, if any.

[c] The values for "Total Annex A sources" in the columns "As reported", "Revised estimates" and "Final" may not equal the sum of the values for the gases in those columns owing to rounding.

[d] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Table 14
Information to be included in the compilation and accounting database in t CO_2 eq for 2008

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2008				
CO_2	8 106 293	8 106 344		8 106 344
CH_4	1 658 173			1 658 173
N_2O	1 648 774			1 648 774
HFCs	72 830	72 845		72 845
PFCs	NA, NO			NA, NO
SF_6	10 076			10 076
Total Annex A sources[c]	**11 496 146**	**11 496 213**		**11 496 213**
Activities under Article 3, paragraph 3, for 2008				
3 3 Afforestation and reforestation on non-harvested land for 2008	–226 456	–19 018		–19 018
3 3 Afforestation and reforestation on harvested land for 2008	NA, NO			NA, NO
3 3 Deforestation for 2008	1 317 700			1 317 700
Activities under Article 3, paragraph 4, for 2008[d]				
3 4 Forest management for 2008	–17 106 354	–17 313 792		–17 313 792
3 4 Cropland management for 2008				
3 4 Cropland management for the base year				
3 4 Grazing land management for 2008				
3 4 Grazing land management for the base year				
3 4 Revegetation for 2008				
3 4 Revegetation for the base year				

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, NA = not applicable, NO = not occurring.

[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

[b] "Final" includes revised estimates, if any, and/or adjustments, if any.

[c] The values for "Total Annex A sources" in the columns "As reported", "Revised estimates" and "Final" may not equal the sum of the values for the gases in those columns owing to rounding.

[d] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Annex II

Documents and information used during the review

A. Reference documents

Intergovernmental Panel on Climate Change. *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. Available at <http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html>.

Intergovernmental Panel on Climate Change. *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*. Available at <http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.htm>.

Intergovernmental Panel on Climate Change. *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. Available at <http://www.ipcc-nggip.iges.or.jp/public/gp/english/>.

Intergovernmental Panel on Climate Change. *Good Practice Guidance for Land Use, Land-Use Change and Forestry*. Available at <http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf.htm>.

"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention. Part I: UNFCCC reporting guidelines on annual inventories". FCCC/SBSTA/2006/9. Available at <http://unfccc.int/resource/docs/2006/sbsta/eng/09.pdf>.

"Guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention". FCCC/CP/2002/8. Available at <http://unfccc.int/resource/docs/cop8/08.pdf>.

"Guidelines for national systems for the estimation of anthropogenic greenhouse gas emissions by sources and removals by sinks under Article 5, paragraph 1, of the Kyoto Protocol". Decision 19/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=14>.

"Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol". Decision 15/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=54>.

"Guidelines for review under Article 8 of the Kyoto Protocol". Decision 22/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=51>.

Status report for Latvia 2014. Available at <http://unfccc.int/resource/docs/2014/asr/lva.pdf>.

Synthesis and assessment report on the greenhouse gas inventories submitted in 2014. Available at <http://unfccc.int/resource/webdocs/sai/2014.pdf>.

FCCC/ARR/2013/LVA. Report of the individual review of the annual submission of Latvia submitted in 2013. Available at <http://unfccc.int/resource/docs/2014/arr/lva.pdf>.

Standard independent assessment report template, parts 1 and 2. Available at <http://unfccc.int/kyoto_protocol/registry_systems/independent_assessment_reports/items/4061.php>.

B. Additional information provided by the Party

Responses to questions during the review were received from Ms. Agita Gancone (Climate and Environmental Policy Integration Department, Ministry of Environmental Protection and Regional Development), including additional material on the methodology and assumptions used. The following documents[1] were also provided by Latvia:

V.Bergmanis (2004). Guidance manual for CO2 emission estimations (report developed in accordance with UNFCCC and IPCC recommendations and physical characteristics of fuels used in Latvia).

Andis Lazdiņš, LSFRI Silava (2013). Afforestation in pictures, power point presentation in Latvian Forest Research Day (V).

[1] Reproduced as received from the Party.

Annex III

Acronyms and abbreviations

AD	activity data
AWMS	animal waste management system
BEF	biomass expansion factor
Bo	methane-producing potential
CaO	calcium oxide
CH_4	methane
cm	centimetre
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
Cpregnancy	pregnancy coefficient
CRF	common reporting format
EAF	electric arc furnace
EF	emission factor
ERT	expert review team
EU ETS	European Union Emissions Trading System
Eurostat	Statistical Office of the European Union
FAO	Food and Agriculture Organization of the United Nations
FAOSTAT	FAO database
FOD	first-order decay
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO_2, CH_4, N_2O, HFCs, PFCs and SF_6 without GHG emissions and removals from LULUCF
HFCs	hydrofluorocarbons
IE	included elsewhere
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
ITL	international transaction log
kg	kilogram (1 kg = 1,000 grams)
kha	kilohectare
KP-LULUCF	land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
LULUCF	land use, land-use change and forestry
m	metre
m^3	cubic metre
MCF	methane correction factor
MOU	memorandum of understanding
MSW	municipal solid waste
N	nitrogen
N_2O	nitrous oxide
NA	not applicable
NCV	net calorific value
NE	not estimated
Nep	net energy required for pregnancy
Nex	nitrogen excretion
NFI	national forest inventory
NIR	national inventory report
NO	not occurring

OHF	open hearth furnace
PFCs	perfluorocarbons
PJ	petajoule (1 PJ = 10^{15} joule)
QA/QC	quality assurance/quality control
RMU	removal unit
SEF	standard electronic format
SF_6	sulphur hexafluoride
SIAR	standard independent assessment report
SWDS	solid waste disposal site
t	tonne
tp	length of pasture season
TJ	terajoule (1 TJ = 10^{12} joule)
UNFCCC	United Nations Framework Convention on Climate Change